

14-03 WO.sequence listing.txt  
SEQUENCE LISTING

<110> University of Georgia Research Foundation, Inc  
Mohnen, Debra  
Hahn, Michael G.  
Kolli, Venkata S.K.  
Doong, Ron L.  
Sterling, Jason D.

<120> Galacturonosyltransferases, nucleic acids encoding same, and uses therefor

<130> 14-03 WO

<140> Not assigned  
<141> 2004-02-05

<150> US 60/445,539  
<151> 2003-02-06

<160> 50

<170> PatentIn version 3.2

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Phe Ala Pro Leu Cys Phe Phe Val Gly Arg Gly Val Tyr Ile Asp Ser
35          40          45

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Ser Asn Asp Tyr Ser Ile Val Ser Val Lys Gln Asn Leu Asp Trp Arg
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Val Asp Pro Ser Phe Arg His Ser Glu Asn Pro Ala Thr Pro Asp Val  
 115 120 125

Lys Ser Asn Asn Leu Asn Glu Lys Arg Asp Ser Ile Ser Lys Asp Ser  
 130 135 140

Ile His Gln Lys Val Glu Thr Pro Thr Lys Ile His Arg Arg Gln Leu  
 145 150 155 160

Arg Glu Lys Arg Arg Glu Met Arg Ala Asn Glu Leu Val Gln His Asn  
 165 170 175

Asp Asp Thr Ile Leu Lys Leu Glu Asn Ala Ala Ile Glu Arg Ser Lys  
 180 185 190

Ser Val Asp Ser Ala Val Leu Gly Lys Tyr Ser Ile Trp Arg Arg Glu  
 195 200 205

Asn Glu Asn Asp Asn Ser Asp Ser Asn Ile Arg Leu Met Arg Asp Gln  
 210 215 220

Val Ile Met Ala Arg Val Tyr Ser Gly Ile Ala Lys Leu Lys Asn Lys  
 225 230 235 240

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 245 250 255

Val Leu Gly Glu Ala Thr Ser Asp Ala Asp Leu Pro Arg Ser Ala His  
 260 265 270

Glu Lys Leu Arg Ala Met Gly Gln Val Leu Ala Lys Ala Lys Met Gln  
 275 280 285

Leu Tyr Asp Cys Lys Leu Val Thr Gly Lys Leu Arg Ala Met Leu Gln  
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Thr Ala Asp Glu Gln Val Arg Ser Leu Lys Lys Gln Ser Thr Phe Leu  
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Ala Gln Leu Ala Ala Lys Thr Ile Pro Asn Pro Ile His Cys Leu Ser  
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Met Arg Leu Thr Ile Asp Tyr Tyr Leu Leu Ser Pro Glu Lys Arg Lys  
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 Leu Phe Ser Asp Asn Val Leu Ala Ala Ser Val Val Val Asn Ser Thr  
 370 375 380  
 Ile Met Asn Ala Lys Asp Pro Ser Lys His Val Phe His Leu Val Thr  
 385 390 395 400  
 Asp Lys Leu Asn Phe Gly Ala Met Asn Met Trp Phe Leu Leu Asn Pro  
 405 410 415  
 Pro Gly Lys Ala Thr Ile His Val Glu Asn Val Asp Glu Phe Lys Trp  
 420 425 430  
 Leu Asn Ser Ser Tyr Cys Pro Val Leu Arg Gln Leu Glu Ser Ala Ala  
 435 440 445  
 Met Arg Glu Tyr Tyr Phe Lys Ala Asp His Pro Thr Ser Gly Ser Ser  
 450 455 460  
 Asn Leu Lys Tyr Arg Asn Pro Lys Tyr Leu Ser Met Leu Asn His Leu  
 465 470 475 480  
 Arg Phe Tyr Leu Pro Glu Val Tyr Pro Lys Leu Asn Lys Ile Leu Phe  
 485 490 495  
 Leu Asp Asp Asp Ile Ile Val Gln Lys Asp Leu Thr Pro Leu Trp Glu  
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 Val Asn Leu Asn Gly Lys Val Asn Gly Ala Val Glu Thr Cys Gly Glu  
 515 520 525  
 Ser Phe His Arg Phe Asp Lys Tyr Leu Asn Phe Ser Asn Pro His Ile  
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 Ala Arg Asn Phe Asn Pro Asn Ala Cys Gly Trp Ala Tyr Gly Met Asn  
 545 550 555 560  
 Met Phe Asp Leu Lys Glu Trp Lys Lys Arg Asp Ile Thr Gly Ile Tyr  
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 His Lys Trp Gln Asn Met Asn Glu Asn Arg Thr Leu Trp Lys Leu Gly  
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## 14-03 WO.sequence listing.txt

Thr Leu Pro Pro Gly Leu Ile Thr Phe Tyr Gly Leu Thr His Pro Leu  
595 600 605

Asn Lys Ala Trp His Val Leu Gly Leu Gly Tyr Asn Pro Ser Ile Asp  
610 615 620

Lys Lys Asp Ile Glu Asn Ala Ala Val Val His Tyr Asn Gly Asn Met  
625 630 635 640

Lys Pro Trp Leu Glu Leu Ala Met Ser Lys Tyr Arg Pro Tyr Trp Thr  
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<212> DNA  
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 35 40 45

Ser Pro Gly Phe Val Thr Val Gln Pro Ala Ser Ser Phe Glu Ser Phe  
 50 55 60

Thr Arg Ile Asn Ala Thr Lys His Thr Gln Arg Asp Val Ser Glu Arg  
 65 70 75 80

Val Asp Glu Val Leu Gln Lys Ile Asn Pro Val Leu Pro Lys Lys Ser  
 85 90 95

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Asp Ile Asn Val Gly Ser Arg Asp Val Asn Ala Thr Ser Gly Thr Asp  
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Ser Lys Lys Arg Gly Leu Pro Val Ser Pro Thr Val Val Ala Asn Pro  
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Ser Pro Ala Asn Lys Thr Lys Ser Glu Ala Ser Tyr Thr Gly Val Gln  
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Arg Lys Ile Val Ser Gly Asp Glu Thr Trp Arg Thr Cys Glu Val Lys  
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Tyr Gly Ser Tyr Cys Leu Trp Arg Glu Glu Asn Lys Glu Pro Met Lys  
 165 170 175

Asp Ala Lys Val Lys Gln Met Lys Asp Gln Leu Phe Val Ala Arg Ala  
 180 185 190

Tyr Tyr Pro Ser Ile Ala Lys Met Pro Ser Gln Ser Lys Leu Thr Arg  
 195 200 205

Asp Met Lys Gln Asn Ile Gln Glu Phe Glu Arg Ile Leu Ser Glu Ser  
 210 215 220

Ser Gln Asp Ala Asp Leu Pro Pro Gln Val Asp Lys Lys Leu Gln Lys  
 225 230 235 240

Met Glu Ala Val Ile Ala Lys Ala Lys Ser Phe Pro Val Asp Cys Asn  
 245 250 255

Asn Val Asp Lys Lys Leu Arg Gln Ile Leu Asp Leu Thr Glu Asp Glu  
 260 265 270

Ala Ser Phe His Met Lys Gln Ser Val Phe Leu Tyr Gln Leu Ala Val  
 275 280 285

Gln Thr Met Pro Lys Ser Leu His Cys Leu Ser Met Arg Leu Thr Val  
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Glu His Phe Lys Ser Asp Ser Leu Glu Asp Pro Ile Ser Glu Lys Phe  
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Ser Asp Pro Ser Leu Leu His Phe Val Ile Ile Ser Asp Asn Ile Leu  
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Ala Ser Ser Val Val Ile Asn Ser Thr Val Val His Ala Arg Asp Ser  
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## 14-03 WO.sequence listing.txt

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 370 375 380  
 Val Leu Asn Ile Glu Lys Leu Glu Leu Asp Asp Ser Asp Met Lys Leu  
 385 390 395 400  
 Ser Leu Ser Ala Glu Phe Arg Val Ser Phe Pro Ser Gly Asp Leu Leu  
 405 410 415  
 Ala Ser Gln Gln Asn Arg Thr His Tyr Leu Ser Leu Phe Ser Gln Ser  
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 His Tyr Leu Leu Pro Lys Leu Phe Asp Lys Leu Glu Lys Val Val Ile  
 435 440 445  
 Leu Asp Asp Asp Val Val Val Gln Arg Asp Leu Ser Pro Leu Trp Asp  
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 Leu Asp Met Glu Gly Lys Val Asn Gly Ala Val Lys Ser Cys Thr Val  
 465 470 475 480  
 Arg Leu Gly Gln Leu Arg Ser Leu Lys Arg Gly Asn Phe Asp Thr Asn  
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 Ala Cys Leu Trp Met Ser Gly Leu Asn Val Val Asp Leu Ala Arg Trp  
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 Ser Gly Leu Gly Tyr Asp Tyr Tyr Ile Asn Ala Gln Ala Ile Lys Asn  
 565 570 575  
 Ala Ala Ile Leu His Tyr Asn Gly Asn Met Lys Pro Trp Leu Glu Leu  
 580 585 590  
 Gly Ile Pro Asn Tyr Lys Asn Tyr Trp Arg Arg His Leu Ser Arg Glu  
 595 600 605



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<213> Arabidopsis thaliana

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<400> 6

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20 25 30

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Thr Pro Phe Ser Lys Arg Asp Phe Leu Glu Asp Val Thr Ala Leu Thr
35 40 45

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```

Phe Asn Ser Asp Glu Asn Arg Leu Asn Leu Leu Pro Arg Glu Ser Pro
50 55 60

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Ala Val Leu Arg Gly Gly Leu Val Gly Ala Val Tyr Ser Asp Lys Asn
65 70 75 80

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Ser Arg Arg Leu Asp Gln Leu Ser Ala Arg Val Leu Ser Ala Thr Asp
85 90 95

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Asp Asp Thr His Ser His Thr Asp Ile Ser Ile Lys Gln Val Thr His
100 105 110

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Asp Ala Ala Ser Asp Ser His Ile Asn Arg Glu Asn Met His Val Gln
115 120 125

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Leu Thr Gln Gln Thr Ser Glu Lys Val Asp Glu Gln Pro Glu Pro Asn
130 135 140

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Ala Phe Gly Ala Lys Lys Asp Thr Gly Asn Val Leu Met Pro Asp Ala
145 150 155 160

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Gln Val Arg His Leu Lys Asp Gln Leu Ile Arg Ala Lys Val Tyr Leu
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## 14-03 WO.sequence listing.txt

Ser Leu Pro Ser Ala Lys Ala Asn Ala His Phe Val Arg Glu Leu Arg  
 180 185 190

Leu Arg Ile Lys Glu Val Gln Arg Ala Leu Ala Asp Ala Ser Lys Asp  
 195 200 205

Ser Asp Leu Pro Lys Thr Ala Ile Glu Lys Leu Lys Ala Met Glu Gln  
 210 215 220

Thr Leu Ala Lys Gly Lys Gln Ile Gln Asp Asp Cys Ser Thr Val Val  
 225 230 235 240

Lys Lys Leu Arg Ala Met Leu His Ser Ala Asp Glu Gln Leu Arg Val  
 245 250 255

His Lys Lys Gln Thr Met Phe Leu Thr Gln Leu Thr Ala Lys Thr Ile  
 260 265 270

Pro Lys Gly Leu His Cys Leu Pro Leu Arg Leu Thr Thr Asp Tyr Tyr  
 275 280 285

Ala Leu Asn Ser Ser Glu Gln Gln Phe Pro Asn Gln Glu Lys Leu Glu  
 290 295 300

Asp Thr Gln Leu Tyr His Tyr Ala Leu Phe Ser Asp Asn Val Leu Ala  
 305 310 315 320

Thr Ser Val Val Val Asn Ser Thr Ile Thr Asn Ala Lys His Pro Leu  
 325 330 335

Lys His Val Phe His Ile Val Thr Asp Arg Leu Asn Tyr Ala Ala Met  
 340 345 350

Arg Met Trp Phe Leu Asp Asn Pro Pro Gly Lys Ala Thr Ile Gln Val  
 355 360 365

Gln Asn Val Glu Glu Phe Thr Trp Leu Asn Ser Ser Tyr Ser Pro Val  
 370 375 380

Leu Lys Gln Leu Ser Ser Arg Ser Met Ile Asp Tyr Tyr Phe Arg Ala  
 385 390 395 400

His His Thr Asn Ser Asp Thr Asn Leu Lys Phe Arg Asn Pro Lys Tyr  
 405 410 415

Leu Ser Ile Leu Asn His Leu Arg Phe Tyr Leu Pro Glu Ile Phe Pro  
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## 14-03 WO.sequence listing.txt

Lys Leu Ser Lys Val Leu Phe Leu Asp Asp Asp Ile Val Val Gln Lys  
 435 440 445

Asp Leu Ser Gly Leu Trp Ser Val Asp Leu Lys Gly Asn Val Asn Gly  
 450 455 460

Ala Val Glu Thr Cys Gly Glu Ser Phe His Arg Phe Asp Arg Tyr Leu  
 465 470 475 480

Asn Phe Ser Asn Pro Leu Ile Ser Lys Asn Phe Asp Pro Arg Ala Cys  
 485 490 495

Gly Trp Ala Tyr Gly Met Asn Val Phe Asp Leu Asp Glu Trp Lys Arg  
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Gln Asn Ile Thr Glu Val Tyr His Arg Trp Gln Asp Leu Asn Gln Asp  
 515 520 525

Arg Glu Leu Trp Lys Leu Gly Thr Leu Pro Pro Gly Leu Ile Thr Phe  
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Trp Arg Arg Thr Tyr Pro Leu Asp Arg Lys Trp His Ile Leu Gly Leu  
 545 550 555 560

Gly Tyr Asn Pro Ser Val Asn Gln Arg Asp Ile Glu Arg Ala Ala Val  
 565 570 575

Ile His Tyr Asn Gly Asn Leu Lys Pro Trp Leu Glu Ile Gly Ile Pro  
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Arg Tyr Arg Gly Phe Trp Ser Lys His Val Asp Tyr Glu His Val Tyr  
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Leu Arg Glu Cys Asn Ile Asn Pro  
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## 14-03 WO.sequence listing.txt

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cattatgttg tcttctctga caatgttttg gcttcttcag tcgttggtta ctctacgata 960
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gctgggaaat ttagtcctag agcttgaca tgggctttcg ggatgaatct aattgatctc 1440
gaagaatgga gaatacggaa gttgacttct acatacataa aatacttcaa cctgggaaca 1500
aagagaccat tgtggaaagc tgggagctta ccaatagggt ggttgacttt ctataggcaa 1560
acattagcat tggacaagag atggcatgtg atgggggttag gtcgcgaatc aggagtcaaa 1620
gcggttgaca tcgaacaagc ggcagttata cactacgatg gggtcatgaa gccgtggttg 1680
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&lt;210&gt; 8

&lt;211&gt; 589

&lt;212&gt; PRT

&lt;213&gt; Arabidopsis thaliana

&lt;400&gt; 8

Met Lys Gln Ile Arg Arg Trp Gln Arg Ile Leu Ile Leu Ala Leu Leu  
1 5 10 15

## 14-03 WO.sequence listing.txt

Ser Ile Ser Val Phe Ala Pro Leu Ile Phe Val Ser Asn Arg Leu Lys  
 20 25 30  
 Ser Ile Thr Pro Val Gly Arg Arg Glu Phe Ile Glu Glu Leu Ser Lys  
 35 40 45  
 Ile Arg Phe Thr Thr Asn Asp Leu Arg Leu Ser Ala Ile Glu His Glu  
 50 55 60  
 Asp Gly Glu Gly Leu Lys Gly Pro Arg Leu Ile Leu Phe Lys Asp Gly  
 65 70 75 80  
 Glu Phe Asn Ser Ser Ala Glu Ser Asp Gly Gly Asn Thr Tyr Lys Asn  
 85 90 95  
 Arg Glu Glu Gln Val Ile Val Ser Gln Lys Met Thr Val Ser Ser Asp  
 100 105 110  
 Glu Lys Gly Gln Ile Leu Pro Thr Val Asn Gln Leu Ala Asn Lys Thr  
 115 120 125  
 Asp Phe Lys Pro Pro Leu Ser Lys Gly Glu Lys Asn Thr Arg Val Gln  
 130 135 140  
 Pro Asp Arg Ala Thr Asp Val Lys Thr Lys Glu Ile Arg Asp Lys Ile  
 145 150 155 160  
 Ile Gln Ala Lys Ala Tyr Leu Asn Phe Ala Pro Pro Gly Ser Asn Ser  
 165 170 175  
 Gln Val Val Lys Glu Leu Arg Gly Arg Leu Lys Glu Leu Glu Arg Ser  
 180 185 190  
 Val Gly Asp Ala Thr Lys Asp Lys Asp Leu Ser Lys Gly Ala Leu Arg  
 195 200 205  
 Arg Val Lys Pro Met Glu Asn Val Leu Tyr Lys Ala Ser Arg Val Phe  
 210 215 220  
 Asn Asn Cys Pro Ala Ile Ala Thr Lys Leu Arg Ala Met Asn Tyr Asn  
 225 230 235 240  
 Thr Glu Glu Gln Val Gln Ala Gln Lys Asn Gln Ala Ala Tyr Leu Met  
 245 250 255  
 Gln Leu Ala Ala Arg Thr Thr Pro Lys Gly Leu His Cys Leu Ser Met  
 260 265 270

## 14-03 WO.sequence listing.txt

Arg Leu Thr Ser Glu Tyr Phe Ser Leu Asp Pro Glu Lys Arg Gln Met  
 275 280 285  
 Pro Asn Gln Gln Asn Tyr Phe Asp Ala Asn Phe Asn His Tyr Val Val  
 290 295 300  
 Phe Ser Asp Asn Val Leu Ala Ser Ser Val Val Val Asn Ser Thr Ile  
 305 310 315 320  
 Ser Ser Ser Lys Glu Pro Glu Arg Ile Val Phe His Val Val Thr Asp  
 325 330 335  
 Ser Leu Asn Tyr Pro Ala Ile Ser Met Trp Phe Leu Leu Asn Ile Gln  
 340 345 350  
 Ser Lys Ala Thr Ile Gln Ile Leu Asn Ile Asp Asp Met Asp Val Leu  
 355 360 365  
 Pro Arg Asp Tyr Asp Gln Leu Leu Met Lys Gln Asn Ser Asn Asp Pro  
 370 375 380  
 Arg Phe Ile Ser Thr Leu Asn His Ala Arg Phe Tyr Leu Pro Asp Ile  
 385 390 395 400  
 Phe Pro Gly Leu Asn Lys Met Val Leu Leu Asp His Asp Val Val Val  
 405 410 415  
 Gln Arg Asp Leu Ser Arg Leu Trp Ser Ile Asp Met Lys Gly Lys Val  
 420 425 430  
 Val Gly Ala Val Glu Thr Cys Leu Glu Gly Glu Ser Ser Phe Arg Ser  
 435 440 445  
 Met Ser Thr Phe Ile Asn Phe Ser Asp Thr Trp Val Ala Gly Lys Phe  
 450 455 460  
 Ser Pro Arg Ala Cys Thr Trp Ala Phe Gly Met Asn Leu Ile Asp Leu  
 465 470 475 480  
 Glu Glu Trp Arg Ile Arg Lys Leu Thr Ser Thr Tyr Ile Lys Tyr Phe  
 485 490 495  
 Asn Leu Gly Thr Lys Arg Pro Leu Trp Lys Ala Gly Ser Leu Pro Ile  
 500 505 510  
 Gly Trp Leu Thr Phe Tyr Arg Gln Thr Leu Ala Leu Asp Lys Arg Trp

14-03 WO.sequence listing.txt

515

520

525

His Val Met Gly Leu Gly Arg Glu Ser Gly Val Lys Ala Val Asp Ile  
 530 535 540

Glu Gln Ala Ala Val Ile His Tyr Asp Gly Val Met Lys Pro Trp Leu  
 545 550 555 560

Asp Ile Gly Lys Glu Asn Tyr Lys Arg Tyr Trp Asn Ile His Val Pro  
 565 570 575

Tyr His His Thr Tyr Leu Gln Gln Cys Asn Leu Gln Ala  
 580 585

<210> 9  
 <211> 1614  
 <212> DNA  
 <213> Arabidopsis thaliana

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 caccatcaac aagatccatc ccagctttta cttgagagag acacgagaac cgaaatggta 180  
 tctcctccc atttaactt cacggaagag gtcacaagtg cttcctcctt ctctaggcag 240  
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 atgaaatctc acatccaagc acttgaagag cgtgcaaagc cagctactgt tcagaccaca 540  
 atatttgggc aattgggtgc tgaggcatta ccaaagagcc tccactgttt gacgataaag 600  
 ctacatctg attgggtaac agagccatct cgccatgaac tggcagatga gaacagaaac 660  
 tcacctagac ttgtcgacaa caacctctac cacttctgca tcttctcgga caacgtgatt 720  
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 ttccacatag tgacgaatcg agtgagctac aaagctatgc aggcctgggt tctaagtaat 840  
 gacttcaagg gctcagcaat agagatcagg agcgtagagg agttttcttg gttgaatgct 900  
 tcatattctc ctgttggtta gcaactgctg gacacagatg caagagctta ctatttcggg 960  
 gaacagacaa gtcaagatac gatttccgag ccaaagtgga ggaacccaaa gtacttggtca 1020  
 ttactgaacc atctcagatt ctacattccg gagatctatc cacagctaga gaagattggt 1080  
 ttcctagacg atgatgttgt tgttcagaaa gatttgactc cactcttctc cttggatctg 1140



## 14-03 WO.sequence listing.txt

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catggaaacg tcaatggagc tgtggaaaca tgtcttgaag cctttcaccg atattacaag 1200
tatctaaatt tctcgaaccc actcatcagc tcaaagttcg acccacaagc atgtggatgg 1260
gcttttggtg tgaacgtttt tgatctgagc gcttggagga atgcaaactg gactgctcgg 1320
taccattact ggcaagatca gaacagagaa cgaacgcttt ggaaactcgg gacactccct 1380
ccaggtctac tatctttcta tggcttcaca gagccactgg acagaagatg gcatgtcttg 1440
ggtttaggtt acgatgtgaa catcgataac cgtctgagcg aaacagcagc tgtgattcac 1500
tataatggta acatgaagcc ttggctaaag ctggctattg gtaggtataa acctttctgg 1560
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<210> 10
<211> 537
<212> PRT
<213> Arabidopsis thaliana

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<400> 10

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Met Arg Arg Trp Pro Val Asp His Arg Arg Arg Gly Arg Arg Arg Leu
1 5 10 15

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Ser Ser Trp Ile Trp Phe Leu Leu Gly Ser Phe Ser Val Ala Gly Leu
20 25 30

```

```

Val Leu Phe Ile Val Gln His Tyr His His Gln Gln Asp Pro Ser Gln
35 40 45

```

```

Leu Leu Leu Glu Arg Asp Thr Arg Thr Glu Met Val Ser Pro Pro His
50 55 60

```

```

Leu Asn Phe Thr Glu Glu Val Thr Ser Ala Ser Ser Phe Ser Arg Gln
65 70 75 80

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```

Leu Ala Glu Gln Met Thr Leu Ala Lys Ala Tyr Val Phe Ile Ala Lys
85 90 95

```

```

Glu His Asn Asn Leu His Leu Ala Trp Glu Leu Ser Ser Lys Ile Arg
100 105 110

```

```

Ser Cys Gln Leu Leu Leu Ser Lys Ala Ala Met Arg Gly Gln Pro Ile
115 120 125

```

```

Ser Phe Asp Glu Ala Lys Pro Ile Ile Thr Gly Leu Ser Ala Leu Ile
130 135 140

```

```

Tyr Lys Ala Gln Asp Ala His Tyr Asp Ile Ala Thr Thr Met Met Thr
145 150 155 160

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## 14-03 WO.sequence listing.txt

Met Lys Ser His Ile Gln Ala Leu Glu Glu Arg Ala Asn Ala Ala Thr  
 165 170 175  
 Val Gln Thr Thr Ile Phe Gly Gln Leu Val Ala Glu Ala Leu Pro Lys  
 180 185 190  
 Ser Leu His Cys Leu Thr Ile Lys Leu Thr Ser Asp Trp Val Thr Glu  
 195 200 205  
 Pro Ser Arg His Glu Leu Ala Asp Glu Asn Arg Asn Ser Pro Arg Leu  
 210 215 220  
 Val Asp Asn Asn Leu Tyr His Phe Cys Ile Phe Ser Asp Asn Val Ile  
 225 230 235 240  
 Ala Thr Ser Val Val Val Asn Ser Thr Val Ser Asn Ala Asp His Pro  
 245 250 255  
 Lys Gln Leu Val Phe His Ile Val Thr Asn Arg Val Ser Tyr Lys Ala  
 260 265 270  
 Met Gln Ala Trp Phe Leu Ser Asn Asp Phe Lys Gly Ser Ala Ile Glu  
 275 280 285  
 Ile Arg Ser Val Glu Glu Phe Ser Trp Leu Asn Ala Ser Tyr Ser Pro  
 290 295 300  
 Val Val Lys Gln Leu Leu Asp Thr Asp Ala Arg Ala Tyr Tyr Phe Gly  
 305 310 315 320  
 Glu Gln Thr Ser Gln Asp Thr Ile Ser Glu Pro Lys Val Arg Asn Pro  
 325 330 335  
 Lys Tyr Leu Ser Leu Leu Asn His Leu Arg Phe Tyr Ile Pro Glu Ile  
 340 345 350  
 Tyr Pro Gln Leu Glu Lys Ile Val Phe Leu Asp Asp Asp Val Val Val  
 355 360 365  
 Gln Lys Asp Leu Thr Pro Leu Phe Ser Leu Asp Leu His Gly Asn Val  
 370 375 380  
 Asn Gly Ala Val Glu Thr Cys Leu Glu Ala Phe His Arg Tyr Tyr Lys  
 385 390 395 400  
 Tyr Leu Asn Phe Ser Asn Pro Leu Ile Ser Ser Lys Phe Asp Pro Gln  
 405 410 415

## 14-03 WO.sequence listing.txt

Ala Cys Gly Trp Ala Phe Gly Met Asn Val Phe Asp Leu Ile Ala Trp  
 420 425 430

Arg Asn Ala Asn Val Thr Ala Arg Tyr His Tyr Trp Gln Asp Gln Asn  
 435 440 445

Arg Glu Arg Thr Leu Trp Lys Leu Gly Thr Leu Pro Pro Gly Leu Leu  
 450 455 460

Ser Phe Tyr Gly Leu Thr Glu Pro Leu Asp Arg Arg Trp His Val Leu  
 465 470 475 480

Gly Leu Gly Tyr Asp Val Asn Ile Asp Asn Arg Leu Ile Glu Thr Ala  
 485 490 495

Ala Val Ile His Tyr Asn Gly Asn Met Lys Pro Trp Leu Lys Leu Ala  
 500 505 510

Ile Gly Arg Tyr Lys Pro Phe Trp Leu Lys Phe Leu Asn Ser Ser His  
 515 520 525

Pro Tyr Leu Gln Asp Cys Val Thr Ala  
 530 535

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 <211> 1611  
 <212> DNA  
 <213> Arabidopsis thaliana

<400> 11  
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 ggtcatattg aacctagacc ctctattcct aagcgacggt accgtaatga caaatttgta 180  
 gagggtatga atatgactga ggaaatgttg agtcctactt ccgttgctcg tcaagttaat 240  
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 ttgcttgagg acttaagtgc tcagatccgt aactctcagt tgcttttatc gagtgtgct 360  
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 ttgttatatc aagctcagca gcttcactat gatagtgcta ctatgattat gaggcttaag 480  
 gcctcgattc aggctcttga agaacaaatg agttccgta gcgagaagag ttccaagtat 540  
 ggacagattg ctgctgagga agtgcctaag agtctttact gtcttggtgt tcgtctcact 600  
 accgaatggt ttcagaattt agacttacag agaactctta aggaaaggag tcgtgttgat 660  
 tcgaaactca cggataacag tctctaccat ttctgtgtgt tttccgataa cattattgct 720

## 14-03 WO.sequence listing.txt

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gacaacctca gaggagtcac tgtggagggtt cagaagttcg aggatttctc atggctgaat 900
gcttcctatg ttccggtcct caagcagctg caagactctg atacgcaaag ctattatttc 960
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tacttgaact attctcatcc tctcatagc tcccactttg atccagatgc gtgtgggtgg 1260
gcgtttggaa tgaacgtctt tgatttagtt gagtggagga agagaaatgt gaccggcata 1320
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aatgggaact taaagccatg gttgaagatc gggatagaga agtacaacc tttgtgggag 1560
agatacgttg attacacttc tccttttatg caacaatgca attttcattg a 1611

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<210> 12  
 <211> 536  
 <212> PRT  
 <213> Arabidopsis thaliana

<400> 12

Met Arg Arg Arg Gly Gly Asp Ser Phe Arg Arg Ala Gly Arg Arg Lys  
 1 5 10 15

Ile Ser Asn Val Val Trp Trp Val Leu Ser Gly Ile Ala Leu Leu Leu  
 20 25 30

Phe Phe Leu Ile Leu Ser Lys Ala Gly His Ile Glu Pro Arg Pro Ser  
 35 40 45

Ile Pro Lys Arg Arg Tyr Arg Asn Asp Lys Phe Val Glu Gly Met Asn  
 50 55 60

Met Thr Glu Glu Met Leu Ser Pro Thr Ser Val Ala Arg Gln Val Asn  
 65 70 75 80

Asp Gln Ile Ala Leu Ala Lys Ala Phe Val Val Ile Ala Lys Glu Ser  
 85 90 95

## 14-03 WO.sequence listing.txt

Lys Asn Leu Gln Phe Ala Trp Asp Leu Ser Ala Gln Ile Arg Asn Ser  
 100 105 110  
 Gln Leu Leu Leu Ser Ser Ala Ala Thr Arg Arg Ser Pro Leu Thr Val  
 115 120 125  
 Leu Glu Ser Glu Ser Thr Ile Arg Asp Met Ala Val Leu Leu Tyr Gln  
 130 135 140  
 Ala Gln Gln Leu His Tyr Asp Ser Ala Thr Met Ile Met Arg Leu Lys  
 145 150 155 160  
 Ala Ser Ile Gln Ala Leu Glu Glu Gln Met Ser Ser Val Ser Glu Lys  
 165 170 175  
 Ser Ser Lys Tyr Gly Gln Ile Ala Ala Glu Glu Val Pro Lys Ser Leu  
 180 185 190  
 Tyr Cys Leu Gly Val Arg Leu Thr Thr Glu Trp Phe Gln Asn Leu Asp  
 195 200 205  
 Leu Gln Arg Thr Leu Lys Glu Arg Ser Arg Val Asp Ser Lys Leu Thr  
 210 215 220  
 Asp Asn Ser Leu Tyr His Phe Cys Val Phe Ser Asp Asn Ile Ile Ala  
 225 230 235 240  
 Thr Ser Val Val Val Asn Ser Thr Ala Leu Asn Ser Lys Ala Pro Glu  
 245 250 255  
 Lys Val Val Phe His Leu Val Thr Asn Glu Ile Asn Tyr Ala Ala Met  
 260 265 270  
 Lys Ala Trp Phe Ala Ile Asn Met Asp Asn Leu Arg Gly Val Thr Val  
 275 280 285  
 Glu Val Gln Lys Phe Glu Asp Phe Ser Trp Leu Asn Ala Ser Tyr Val  
 290 295 300  
 Pro Val Leu Lys Gln Leu Gln Asp Ser Asp Thr Gln Ser Tyr Tyr Phe  
 305 310 315 320  
 Ser Gly His Asn Asp Asp Gly Arg Thr Pro Ile Lys Phe Arg Asn Pro  
 325 330 335  
 Lys Tyr Leu Ser Met Leu Asn His Leu Arg Phe Tyr Ile Pro Glu Val  
 340 345 350

## 14-03 WO.sequence listing.txt

Phe Pro Ala Leu Lys Lys Val Val Phe Leu Asp Asp Asp Val Val Val  
 355 360 365

Gln Lys Asp Leu Ser Ser Leu Phe Ser Ile Asp Leu Asn Lys Asn Val  
 370 375 380

Asn Gly Ala Val Glu Thr Cys Met Glu Thr Phe His Arg Tyr His Lys  
 385 390 395 400

Tyr Leu Asn Tyr Ser His Pro Leu Ile Arg Ser His Phe Asp Pro Asp  
 405 410 415

Ala Cys Gly Trp Ala Phe Gly Met Asn Val Phe Asp Leu Val Glu Trp  
 420 425 430

Arg Lys Arg Asn Val Thr Gly Ile Tyr His Tyr Trp Gln Glu Lys Asn  
 435 440 445

Val Asp Arg Thr Leu Trp Lys Leu Gly Thr Leu Pro Pro Gly Leu Leu  
 450 455 460

Thr Phe Tyr Gly Leu Thr Glu Ala Leu Glu Ala Ser Trp His Ile Leu  
 465 470 475 480

Gly Leu Gly Tyr Thr Asn Val Asp Ala Arg Val Ile Glu Lys Gly Ala  
 485 490 495

Val Leu His Phe Asn Gly Asn Leu Lys Pro Trp Leu Lys Ile Gly Ile  
 500 505 510

Glu Lys Tyr Lys Pro Leu Trp Glu Arg Tyr Val Asp Tyr Thr Ser Pro  
 515 520 525

Phe Met Gln Gln Cys Asn Phe His  
 530 535

<210> 13

<211> 1833

<212> DNA

<213> Arabidopsis thaliana

<400> 13

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gaattcattg aagaattatc cgacattaca gataagaccg aggatgaact tagacttact 180

gctattgaac aggacgaaga aggcttgaag gaggcctaaac gtattctgca ggatcgagat 240

## 14-03 WO.sequence listing.txt

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gaggaacaag cagttttcaca gaaaaccaca gtaagctcga atgcggaggt gaaaatttca 420
gcaagagata ttcaacttaa tcataaaacg gaattccgac ccccttcaag taagagtga 480
aagaatacaa gggttcaact tgaaagagca acagatgaga gggtaaagga gatcagagac 540
aaaattatcc aagcgaagc ctatctgaat ttggccctac ctgggaataa ctcccaaadc 600
gtaaaggagt tgagagttcg aacgaaagag ctggaacggg ctactggtga tactaccaag 660
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<210> 14  
 <211> 610  
 <212> PRT  
 <213> Arabidopsis thaliana

<400> 14

Met Asn Gln Val Arg Arg Trp Gln Arg Ile Leu Ile Leu Ser Leu Leu

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## 14-03 WO.sequence listing.txt

Gln Ala Met Thr Tyr Lys Thr Glu Glu Gln Ala Arg Ala Gln Lys Lys  
 260 265 270

Gln Ala Ala Tyr Leu Met Gln Leu Ala Ala Arg Thr Thr Pro Lys Gly  
 275 280 285

Leu His Cys Leu Ser Met Arg Leu Thr Thr Glu Tyr Phe Thr Leu Asp  
 290 295 300

His Glu Lys Arg Gln Leu Leu Gln Gln Ser Tyr Asn Asp Pro Asp Leu  
 305 310 315 320

Tyr His Tyr Val Val Phe Ser Asp Asn Val Leu Ala Ser Ser Val Val  
 325 330 335

Val Asn Ser Thr Ile Ser Ser Ser Lys Glu Pro Asp Lys Ile Val Phe  
 340 345 350

His Val Val Thr Asp Ser Leu Asn Tyr Pro Ala Ile Ser Met Trp Phe  
 355 360 365

Leu Leu Asn Pro Ser Gly Arg Ala Ser Ile Gln Ile Leu Asn Ile Asp  
 370 375 380

Glu Met Asn Val Leu Pro Leu Tyr His Ala Glu Leu Leu Met Lys Gln  
 385 390 395 400

Asn Ser Ser Asp Pro Arg Ile Ile Ser Ala Leu Asn His Ala Arg Phe  
 405 410 415

Tyr Leu Pro Asp Ile Phe Pro Gly Leu Asn Lys Ile Val Leu Phe Asp  
 420 425 430

His Asp Val Val Val Gln Arg Asp Leu Thr Arg Leu Trp Ser Leu Asp  
 435 440 445

Met Thr Gly Lys Val Val Gly Ala Val Glu Thr Cys Leu Glu Gly Asp  
 450 455 460

Pro Ser Tyr Arg Ser Met Asp Ser Phe Ile Asn Phe Ser Asp Ala Trp  
 465 470 475 480

Val Ser Gln Lys Phe Asp Pro Lys Ala Cys Thr Trp Ala Phe Gly Met  
 485 490 495

Asn Leu Phe Asp Leu Glu Glu Trp Arg Arg Gln Glu Leu Thr Ser Val  
 500 505 510

## 14-03 WO.sequence listing.txt

Tyr Leu Lys Tyr Phe Asp Leu Gly Val Lys Gly His Leu Trp Lys Ala  
           515                          520                          525

Gly Gly Leu Pro Val Gly Trp Leu Thr Phe Phe Gly Gln Thr Phe Pro  
       530                          535                          540

Leu Glu Lys Arg Trp Asn Val Gly Gly Leu Gly His Glu Ser Gly Leu  
       545                          550                          555                          560

Arg Ala Ser Asp Ile Glu Gln Ala Ala Val Ile His Tyr Asp Gly Ile  
                           565                          570                          575

Met Lys Pro Trp Leu Asp Ile Gly Ile Asp Lys Tyr Lys Arg Tyr Trp  
                           580                          585                          590

Asn Ile His Val Pro Tyr His His Pro His Leu Gln Arg Cys Asn Ile  
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His Asp  
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 agacaggaaa aaagattgga aagggctaata gagctgatga atgatgatag tctgcaaaag 180  
 cttgagacgg cagccatggc acgttccaga tctgtcgaatt ctgcaccact aggaaactac 240  
 accatttgga aaaatgaata ccggagggggc aagagttttg aagatatgtt acgtttgatg 300  
 caagatcaaa tcatcatggc acgagttttac agtggacttg caaagtttac aaacaatctc 360  
 gccttgacc aagagataga aacacaacta atgaaactag cttgggagga agaattctact 420  
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 gcttccaagg cactaccaga tgctatccac tgcttgacca tgcgcttgaa tctagagtat 660  
 catctcctgc ctttaccgat gagaaatttt ccaaggaggg agaatttgga gaatccaaaa 720  
 ctttaccact acgctctctt ctctgataat gtactggctg catcagttgt tgtcaactcc 780  
 acagtcatga atgcacagga tccttcaagg catgttttcc accttgtgac tgataagctc 840

## 14-03 WO.sequence listing.txt

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aactttggag caatgagtat gtggtttctg ttgaaccctc ctggagaagc gaccatccat 900
gtccaaagggt ttgaagattt tacttggtctc aactcatctt actctccagt tttgagtcag 960
ctcgagtcag cagctatgaa gaagttctac ttcaagacag cgagggtctga atcagttgaa 1020
tcaggctcag aaaacctcaa gtaccggtac ccgaaatata tgtcaatgct taaccacctg 1080
aggttctaca tccctaggat cttcccaaag ttggagaaaa tcttgtttgt tgacgatgat 1140
gtggttggtc agaaggattt aactccccta tgggtccattg atcttaaagg gaaagtgaat 1200
gaaaactttg atcccaagtt ctgcggatgg gcttatggga tgaacatctt cgacctgaaa 1260
gaatggaaga agaacaacat tacagaaact tatcactttt ggcaaaacct gaacgaaaac 1320
cggactctat ggaaactagg aacattgccca ccagggtctca taacgttcta caatctgaca 1380
caaccacttc agagaaaatg gcacttactt ggactggggtt atgataaagg aatcgatgtc 1440
aagaagattg aaagatcagc tggtatacat tacaatggac acatgaaacc atggacagag 1500
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1 5 10 15

Arg Phe Gly His Gly Thr Trp Ile Gly Lys Ala Phe Asn Asp Thr Pro  
20 25 30

Glu Met Leu His Glu Arg Ser Leu Arg Gln Glu Lys Arg Leu Glu Arg  
35 40 45

Ala Asn Glu Leu Met Asn Asp Asp Ser Leu Gln Lys Leu Glu Thr Ala  
50 55 60

Ala Met Ala Arg Ser Arg Ser Val Asp Ser Ala Pro Leu Gly Asn Tyr  
65 70 75 80

Thr Ile Trp Lys Asn Glu Tyr Arg Arg Gly Lys Ser Phe Glu Asp Met  
85 90 95

Leu Arg Leu Met Gln Asp Gln Ile Ile Met Ala Arg Val Tyr Ser Gly  
100 105 110

Leu Ala Lys Phe Thr Asn Asn Leu Ala Leu His Gln Glu Ile Glu Thr

## 14-03 WO.sequence listing.txt

115

120

125

Gln Leu Met Lys Leu Ala Trp Glu Glu Glu Ser Thr Asp Ile Asp Gln  
 130 135 140

Glu Gln Arg Val Leu Asp Ser Ile Arg Asp Met Gly Gln Ile Leu Ala  
 145 150 155 160

Arg Ala His Glu Gln Leu Tyr Glu Cys Lys Leu Val Thr Asn Lys Leu  
 165 170 175

Arg Ala Met Leu Gln Thr Val Glu Asp Glu Leu Glu Asn Glu Gln Thr  
 180 185 190

Tyr Ile Thr Phe Leu Thr Gln Leu Ala Ser Lys Ala Leu Pro Asp Ala  
 195 200 205

Ile His Cys Leu Thr Met Arg Leu Asn Leu Glu Tyr His Leu Leu Pro  
 210 215 220

Leu Pro Met Arg Asn Phe Pro Arg Arg Glu Asn Leu Glu Asn Pro Lys  
 225 230 235 240

Leu Tyr His Tyr Ala Leu Phe Ser Asp Asn Val Leu Ala Ala Ser Val  
 245 250 255

Val Val Asn Ser Thr Val Met Asn Ala Gln Asp Pro Ser Arg His Val  
 260 265 270

Phe His Leu Val Thr Asp Lys Leu Asn Phe Gly Ala Met Ser Met Trp  
 275 280 285

Phe Leu Leu Asn Pro Pro Gly Glu Ala Thr Ile His Val Gln Arg Phe  
 290 295 300

Glu Asp Phe Thr Trp Leu Asn Ser Ser Tyr Ser Pro Val Leu Ser Gln  
 305 310 315 320

Leu Glu Ser Ala Ala Met Lys Lys Phe Tyr Phe Lys Thr Ala Arg Ser  
 325 330 335

Glu Ser Val Glu Ser Gly Ser Glu Asn Leu Lys Tyr Arg Tyr Pro Lys  
 340 345 350

Tyr Met Ser Met Leu Asn His Leu Arg Phe Tyr Ile Pro Arg Ile Phe  
 355 360 365

## 14-03 wo.sequence listing.txt

Pro Lys Leu Glu Lys Ile Leu Phe Val Asp Asp Asp Val Val Val Gln  
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Lys Asp Leu Thr Pro Leu Trp Ser Ile Asp Leu Lys Gly Lys Val Asn  
 385 390 395 400

Glu Asn Phe Asp Pro Lys Phe Cys Gly Trp Ala Tyr Gly Met Asn Ile  
 405 410 415

Phe Asp Leu Lys Glu Trp Lys Lys Asn Asn Ile Thr Glu Thr Tyr His  
 420 425 430

Phe Trp Gln Asn Leu Asn Glu Asn Arg Thr Leu Trp Lys Leu Gly Thr  
 435 440 445

Leu Pro Pro Gly Leu Ile Thr Phe Tyr Asn Leu Thr Gln Pro Leu Gln  
 450 455 460

Arg Lys Trp His Leu Leu Gly Leu Gly Tyr Asp Lys Gly Ile Asp Val  
 465 470 475 480

Lys Lys Ile Glu Arg Ser Ala Val Ile His Tyr Asn Gly His Met Lys  
 485 490 495

Pro Trp Thr Glu Met Gly Ile Ser Lys Tyr Gln Pro Tyr Trp Thr Lys  
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Tyr Thr Asn Phe Asp His Pro Tyr Ile Phe Thr Cys Arg Leu Phe Glu  
 515 520 525

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## 14-03 WO.sequence listing.txt

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gctcctgcga ttgttgaagt gaaaagcgtt catcagtttg attggttaac aagagagaat 840
gttccagttc ttgaagctgt ggaaagccat aacagtatca gaaattatta ccatgggaat 900
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Ile Ser Tyr Arg Thr Leu Phe His Thr Ile Leu Ile Leu Ala Phe Leu  
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Leu Pro Phe Val Phe Ile Leu Thr Ala Val Val Thr Leu Glu Gly Val  
 50 55 60

Asn Lys Cys Ser Ser Phe Asp Cys Phe Gly Arg Arg Leu Gly Pro Arg  
 65 70 75 80

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Leu	Pro	Ser 195	Pro	Glu	Leu	Leu	Pro 200	Val	Leu	Ser	Asp	Asn 205	Ala	Tyr	His
His	Phe 210	Val	Leu	Ala	Thr	Asp 215	Asn	Ile	Leu	Ala	Ala 220	Ser	Val	Val	Val
Ser 225	Ser	Ala	Val	Gln	Ser 230	Ser	Ser	Lys	Pro	Glu 235	Lys	Ile	Val	Phe	His 240
Val	Ile	Thr	Asp	Lys 245	Lys	Thr	Tyr	Ala	Gly 250	Met	His	Ser	Trp	Phe 255	Ala
Leu	Asn	Ser	Val 260	Ala	Pro	Ala	Ile	Val 265	Glu	Val	Lys	Ser	Val 270	His	Gln
Phe	Asp	Trp 275	Leu	Thr	Arg	Glu	Asn 280	Val	Pro	Val	Leu	Glu 285	Ala	Val	Glu
Ser	His 290	Asn	Ser	Ile	Arg	Asn 295	Tyr	Tyr	His	Gly	Asn 300	His	Ile	Ala	Gly
Ala 305	Asn	Leu	Ser	Glu	Thr 310	Thr	Pro	Arg	Thr	Phe 315	Ala	Ser	Lys	Leu	Gln 320
Ser	Arg	Ser	Pro	Lys	Tyr	Ile	Ser	Leu	Leu	Asn	His	Leu	Arg	Ile	Tyr

## 14-03 WO.sequence listing.txt

325

330

335

Leu Pro Glu Leu Phe Pro Asn Leu Asp Lys Val Val Phe Leu Asp Asp  
 340 345 350

Asp Ile Val Ile Gln Lys Asp Leu Ser Pro Leu Trp Asp Ile Asp Leu  
 355 360 365

Asn Gly Lys Val Asn Gly Ala Val Glu Thr Cys Arg Gly Glu Asp Val  
 370 375 380

Trp Val Met Ser Lys Arg Leu Arg Asn Tyr Phe Asn Phe Ser His Pro  
 385 390 395 400

Leu Ile Ala Lys His Leu Asp Pro Glu Glu Cys Ala Trp Ala Tyr Gly  
 405 410 415

Met Asn Ile Phe Asp Leu Arg Thr Trp Arg Lys Thr Asn Ile Arg Glu  
 420 425 430

Thr Tyr His Ser Trp Leu Lys Glu Asn Leu Lys Ser Asn Leu Thr Met  
 435 440 445

Trp Lys Leu Gly Thr Leu Pro Pro Ala Leu Ile Ala Phe Lys Gly His  
 450 455 460

Val Gln Pro Ile Asp Ser Ser Trp His Met Leu Gly Leu Gly Tyr Gln  
 465 470 475 480

Ser Lys Thr Asn Leu Glu Asn Ala Lys Lys Ala Ala Val Ile His Tyr  
 485 490 495

Asn Gly Gln Ser Lys Pro Trp Leu Glu Ile Gly Phe Glu His Leu Arg  
 500 505 510

Pro Phe Trp Thr Lys Tyr Val Asn Tyr Ser Asn Asp Phe Ile Lys Asn  
 515 520 525

Cys His Ile Leu Glu  
 530

&lt;210&gt; 19

&lt;211&gt; 1686

&lt;212&gt; DNA

&lt;213&gt; Arabidopsis thaliana

&lt;400&gt; 19

atggcggtgg ccttccgtgg aggccgggga ggcgtcggat ccggccaatc taccggactt

60



## 14-03 WO.sequence listing.txt

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gctgcttacg ctaggaagct aaagcttgat gcttctaagc agcttaagct cttcgaagat	360
ttggctatca acttctcgga ttgacgtcg aaacctgggt tgaaatctgc tgtgtctgat	420
aatggtaatg ctcttgagga ggattcgttt aggcagcttg agaaagaagt gaaggataag	480
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atccagaagt tgaaagatac aatctttgct gtccaagaac agttgacaaa ggctaagaaa	600
aacggtgcgg ttgctagctt gatttcagcc aagtcggttc ctaaaagtct tcattgtttg	660
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gaccagccg cagaggatcc aactctttac cactatgcga ttttctctga taatgtcatt	780
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tcttctatg cgccggtctt gaggcagctt gagtctgcca agttgcagaa gttttacttt	1020
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catgtacttg ggttaggcta taaccggga gtgagcatgg acgaaatcag aaatgcagga	1560
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tctctctgga ctaaatatgt tgataacgaa atggagtttg tgcagatgtg caattttggt	1680
ctctaa	1686

&lt;210&gt; 20

&lt;211&gt; 561

&lt;212&gt; PRT

&lt;213&gt; Arabidopsis thaliana

&lt;400&gt; 20

## 14-03 WO.sequence listing.txt

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 1 5 10 15  
 Ser Thr Gly Leu Arg Ser Phe Phe Ser Tyr Arg Ile Phe Ile Ser Ala  
 20 25 30  
 Leu Phe Ser Phe Leu Phe Leu Ala Thr Phe Ser Val Val Leu Asn Ser  
 35 40 45  
 Ser Arg His Gln Pro His Gln Asp His Thr Leu Pro Ser Met Gly Asn  
 50 55 60  
 Ala Tyr Met Gln Arg Thr Phe Leu Ala Leu Gln Ser Asp Pro Leu Lys  
 65 70 75 80  
 Thr Arg Leu Asp Leu Ile His Lys Gln Ala Ile Asp His Leu Thr Leu  
 85 90 95  
 Val Asn Ala Tyr Ala Ala Tyr Ala Arg Lys Leu Lys Leu Asp Ala Ser  
 100 105 110  
 Lys Gln Leu Lys Leu Phe Glu Asp Leu Ala Ile Asn Phe Ser Asp Leu  
 115 120 125  
 Gln Ser Lys Pro Gly Leu Lys Ser Ala Val Ser Asp Asn Gly Asn Ala  
 130 135 140  
 Leu Glu Glu Asp Ser Phe Arg Gln Leu Glu Lys Glu Val Lys Asp Lys  
 145 150 155 160  
 Val Lys Thr Ala Arg Met Met Ile Val Glu Ser Lys Glu Ser Tyr Asp  
 165 170 175  
 Thr Gln Leu Lys Ile Gln Lys Leu Lys Asp Thr Ile Phe Ala Val Gln  
 180 185 190  
 Glu Gln Leu Thr Lys Ala Lys Lys Asn Gly Ala Val Ala Ser Leu Ile  
 195 200 205  
 Ser Ala Lys Ser Val Pro Lys Ser Leu His Cys Leu Ala Met Arg Leu  
 210 215 220  
 Val Gly Glu Arg Ile Ser Asn Pro Glu Lys Tyr Lys Asp Ala Pro Pro  
 225 230 235 240  
 Asp Pro Ala Ala Glu Asp Pro Thr Leu Tyr His Tyr Ala Ile Phe Ser  
 245 250 255

## 14-03 WO.sequence listing.txt

Asp Asn Val Ile Ala Val Ser Val Val Val Arg Ser Val Val Met Asn  
 260 265 270  
 Ala Glu Glu Pro Trp Lys His Val Phe His Val Val Thr Asp Arg Met  
 275 280 285  
 Asn Leu Ala Ala Met Lys Val Trp Phe Lys Met Arg Pro Leu Asp Arg  
 290 295 300  
 Gly Ala His Val Glu Ile Lys Ser Val Glu Asp Phe Lys Phe Leu Asn  
 305 310 315 320  
 Ser Ser Tyr Ala Pro Val Leu Arg Gln Leu Glu Ser Ala Lys Leu Gln  
 325 330 335  
 Lys Phe Tyr Phe Glu Asn Gln Ala Glu Asn Ala Thr Lys Asp Ser His  
 340 345 350  
 Asn Leu Lys Phe Lys Asn Pro Lys Tyr Leu Ser Met Leu Asn His Leu  
 355 360 365  
 Arg Phe Tyr Leu Pro Glu Met Tyr Pro Lys Leu Asn Lys Ile Leu Phe  
 370 375 380  
 Leu Asp Asp Asp Val Val Val Gln Lys Asp Val Thr Gly Leu Trp Lys  
 385 390 395 400  
 Ile Asn Leu Asp Gly Lys Val Asn Gly Ala Val Glu Thr Cys Phe Gly  
 405 410 415  
 Ser Phe His Arg Tyr Gly Gln Tyr Leu Asn Phe Ser His Pro Leu Ile  
 420 425 430  
 Lys Glu Asn Phe Asn Pro Ser Ala Cys Ala Trp Ala Phe Gly Met Asn  
 435 440 445  
 Ile Phe Asp Leu Asn Ala Trp Arg Arg Glu Lys Cys Thr Asp Gln Tyr  
 450 455 460  
 His Tyr Trp Gln Asn Leu Asn Glu Asp Arg Thr Leu Trp Lys Leu Gly  
 465 470 475 480  
 Thr Leu Pro Pro Gly Leu Ile Thr Phe Tyr Ser Lys Thr Lys Ser Leu  
 485 490 495  
 Asp Lys Ser Trp His Val Leu Gly Leu Gly Tyr Asn Pro Gly Val Ser

## 14-03 WO.sequence listing.txt

500

505

510

Met Asp Glu Ile Arg Asn Ala Gly Val Ile His Tyr Asn Gly Asn Met  
 515 520 525

Lys Pro Trp Leu Asp Ile Ala Met Asn Gln Tyr Lys Ser Leu Trp Thr  
 530 535 540

Lys Tyr Val Asp Asn Glu Met Glu Phe Val Gln Met Cys Asn Phe Gly  
 545 550 555 560

Leu

<210> 21  
 <211> 1680  
 <212> DNA  
 <213> Arabidopsis thaliana

<400> 21  
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 atcacactca cagctttcgc ttccactatc gcaactcttc tcttcactct ctctttcttc 120  
 ttcgcttcag attctaacga ttctcctgat ctctttcttc ccggtggtga gtactctaata 180  
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 gcgagaaagc ttaagctcga gaattcgaaa ctgcgcagga tcttcgctga tctttcgagg 360  
 aattacacgg atctgattaa caaacgcagc tatcgagctt tgtatgattc tgatggagcc 420  
 tcgattgaag aatctgtgct taggcaattt gagaaagaag ttaaggaacg gattaaaatg 480  
 actcgtaag tgattgctga agctaaagag tcttttgata atcagttgaa gattcagaag 540  
 ctgaaagata cgattttcgc tgtaaacgaa cagttaacta atgctaagaa gcaagggtgcg 600  
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 ctgatggaag agaggattgc tcaccctgag aagtatactg atgaagggaa agatagaccg 720  
 cgggagctcg aggatccgaa tctttaccat tacgctatat tttcggataa tgtgattgcg 780  
 gcttcggtgg ttgtgaactc tgctgtgaag aatgctaagg agccgtggaa gcatgttttt 840  
 cacgttgatga ctgataagat gaatcttgga gctatgcagg ttatgtttta actgaaggag 900  
 tataaaggag ctcatgtaga agttaaaagct gttgaggatt atacgttttt gaactcttcg 960  
 tatgtgcctg tggtgaagca gttagaatct gcgaatcttc agaagtttta tttcgagaat 1020  
 aagctcgaga atgcgacgaa agataccacg aatatgaagt tcaggaaccc caagtattta 1080  
 tctatattga atcacttgag gttttattta cccgagatgt acccgaaaact acataggata 1140

## 14-03 WO.sequence listing.txt

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ctgttttttgg acgatgatgt ggttgtgcag aaggatttaa cgggtctgtg ggagattgat 1200
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caatacatga atttctcaca tcctttgatc aaagagaagt ttaatcccaa agcatgtgcg 1320
tgggcgtatg gaatgaactt ctttgatctt gatgcttgga gaagagagaa gtgcacagaa 1380
gaatatcact actggcaaaa tctgaacgag aacagggctc tatggaaact ggggacgtta 1440
ccaccgggac tgatcacctt ttactcaacc acaaagccgc tggacaaatc atggcatgtg 1500
cttgggctgg gttacaatcc gagcattagc atggatgaga tccgcaacgc tgcagtggta 1560
cacttcaacg gtaacatgaa gccatggctt gacatagcta tgaaccagtt tcgaccactt 1620
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<210> 22  
 <211> 559  
 <212> PRT  
 <213> Arabidopsis thaliana

<400> 22

Met Ala Asn His His Arg Leu Leu Arg Gly Gly Gly Ser Pro Ala Ile  
 1 5 10 15

Ile Gly Gly Arg Ile Thr Leu Thr Ala Phe Ala Ser Thr Ile Ala Leu  
 20 25 30

Phe Leu Phe Thr Leu Ser Phe Phe Phe Ala Ser Asp Ser Asn Asp Ser  
 35 40 45

Pro Asp Leu Leu Leu Pro Gly Val Glu Tyr Ser Asn Gly Val Gly Ser  
 50 55 60

Arg Arg Ser Met Leu Asp Ile Lys Ser Asp Pro Leu Lys Pro Arg Leu  
 65 70 75 80

Ile Gln Ile Arg Lys Gln Ala Asp Asp His Arg Ser Leu Ala Leu Ala  
 85 90 95

Tyr Ala Ser Tyr Ala Arg Lys Leu Lys Leu Glu Asn Ser Lys Leu Val  
 100 105 110

Arg Ile Phe Ala Asp Leu Ser Arg Asn Tyr Thr Asp Leu Ile Asn Lys  
 115 120 125

Pro Thr Tyr Arg Ala Leu Tyr Asp Ser Asp Gly Ala Ser Ile Glu Glu  
 130 135 140

Ser Val Leu Arg Gln Phe Glu Lys Glu Val Lys Glu Arg Ile Lys Met  
 Page 37

## 14-03 WO.sequence listing.txt

145                      150                      155                      160  
 Thr Arg Gln Val Ile Ala Glu Ala Lys Glu Ser Phe Asp Asn Gln Leu  
                                  165                                   170                                   175  
 Lys Ile Gln Lys Leu Lys Asp Thr Ile Phe Ala Val Asn Glu Gln Leu  
                                  180                                   185                                   190  
 Thr Asn Ala Lys Lys Gln Gly Ala Phe Ser Ser Leu Ile Ala Ala Lys  
                                  195                                   200                                   205  
 Ser Ile Pro Lys Gly Leu His Cys Leu Ala Met Arg Leu Met Glu Glu  
                                  210                                   215                                   220  
 Arg Ile Ala His Pro Glu Lys Tyr Thr Asp Glu Gly Lys Asp Arg Pro  
                                  225                                   230                                   235                                   240  
 Arg Glu Leu Glu Asp Pro Asn Leu Tyr His Tyr Ala Ile Phe Ser Asp  
                                  245                                   250                                   255  
 Asn Val Ile Ala Ala Ser Val Val Val Asn Ser Ala Val Lys Asn Ala  
                                  260                                   265                                   270  
 Lys Glu Pro Trp Lys His Val Phe His Val Val Thr Asp Lys Met Asn  
                                  275                                   280                                   285  
 Leu Gly Ala Met Gln Val Met Phe Lys Leu Lys Glu Tyr Lys Gly Ala  
                                  290                                   295                                   300  
 His Val Glu Val Lys Ala Val Glu Asp Tyr Thr Phe Leu Asn Ser Ser  
                                  305                                   310                                   315                                   320  
 Tyr Val Pro Val Leu Lys Gln Leu Glu Ser Ala Asn Leu Gln Lys Phe  
                                  325                                   330                                   335  
 Tyr Phe Glu Asn Lys Leu Glu Asn Ala Thr Lys Asp Thr Thr Asn Met  
                                  340                                   345                                   350  
 Lys Phe Arg Asn Pro Lys Tyr Leu Ser Ile Leu Asn His Leu Arg Phe  
                                  355                                   360                                   365  
 Tyr Leu Pro Glu Met Tyr Pro Lys Leu His Arg Ile Leu Phe Leu Asp  
                                  370                                   375                                   380  
 Asp Asp Val Val Val Gln Lys Asp Leu Thr Gly Leu Trp Glu Ile Asp  
                                  385                                   390                                   395                                   400

## 14-03 WO.sequence listing.txt

Met Asp Gly Lys Val Asn Gly Ala Val Glu Thr Cys Phe Gly Ser Phe  
 405 410 415

His Arg Tyr Ala Gln Tyr Met Asn Phe Ser His Pro Leu Ile Lys Glu  
 420 425 430

Lys Phe Asn Pro Lys Ala Cys Ala Trp Ala Tyr Gly Met Asn Phe Phe  
 435 440 445

Asp Leu Asp Ala Trp Arg Arg Glu Lys Cys Thr Glu Glu Tyr His Tyr  
 450 455 460

Trp Gln Asn Leu Asn Glu Asn Arg Ala Leu Trp Lys Leu Gly Thr Leu  
 465 470 475 480

Pro Pro Gly Leu Ile Thr Phe Tyr Ser Thr Thr Lys Pro Leu Asp Lys  
 485 490 495

Ser Trp His Val Leu Gly Leu Gly Tyr Asn Pro Ser Ile Ser Met Asp  
 500 505 510

Glu Ile Arg Asn Ala Ala Val Val His Phe Asn Gly Asn Met Lys Pro  
 515 520 525

Trp Leu Asp Ile Ala Met Asn Gln Phe Arg Pro Leu Trp Thr Lys His  
 530 535 540

Val Asp Tyr Asp Leu Glu Phe Val Gln Ala Cys Asn Phe Gly Leu  
 545 550 555

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 <211> 1623  
 <212> DNA  
 <213> Arabidopsis thaliana

<400> 23  
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 ttctctagtc gcacgttggtt actgttgctg ctgctgctcg ctatcgtcct cccttttattc 180  
 ttcgtcaggt tcgcgttttct cgtcctcgaa tctgcctccg tttgcgattc accactcgat 240  
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 ggatcattgg agtcattcga cgaccttggt aaggagatga cgtaaaacg ccgtgacata 420  
 agggcgtttg cttccgtgac taagaagatg ctgttgacaga tggaacgtaa agtccaatca 480  
 gcgaaacatc atgagttagt gtactggcat ttagcctctc acggtattcc taaaagcctc 540

## 14-03 WO.sequence listing.txt

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cattgccttt ccctcagatt aactgaagag tactctgtaa atgcaatggc tcgaatgcgt    600
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ctgactgaca atgtccttgc tgcctctgtc gtcatatcgt ctactgtaca aaacgctgtg    720
aatcccgaga agtttgtctt tcatattggt accgataaga aaacctatac ccctatgcat    780
gcttggtttg ctatcaactc tgcttcatca ccagttgttg aagtaaaggg acttcatcag    840
tatgattggc ctcaagaagt gaacttcaaa gtagagaga tgctggacat tcaccgctta    900
at ttggagac gacattatca aaatttgaaa gactctgatt ttagttttgt tgagggtact    960
catgagcagt ctttgcaagc tctaaatcct agctgccttg cccttttgaa ccctcttcgc   1020
atttacattc ccaagctttt tccagatctc aacaagatag tgttggtgga tgatgatgta   1080
gtagtacaga gcgatctttc gtctttatgg gaaacggatc tcaacggtaa agttgttggt   1140
gctgtcgttg attcgtggtg cggagacaac tgttgccccg gaagaaaata caaagactat   1200
ttcaacttct cacatccttt gatctcatca aacttagttc aagaagactg tgcttggtt   1260
tctggtatga atgtctttga tctcaaagcc tggagacaaa ccaatattac tgaagcttac   1320
tctacatggc taagactcag tgttagggtc ggactacaat tatggcaacc aggggcttta   1380
ccaccgacat tacttgcttt caaaggactt acacagtctc ttgaaccatc atggcacgtc   1440
gctggactag gttctcgatc cgtaaaatcc cctcaagaga ttctgaaatc tgcttcggtt   1500
ttacatttca gcggttcagc aaaaccgtgg ctagagatca gtaaccctga ggtacgatct   1560
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tga                                                                    1623

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<210> 24
<211> 540
<212> PRT
<213> Arabidopsis thaliana
<400> 24

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Met Lys Phe Tyr Ile Ser Ala Thr Gly Ile Lys Lys Val Thr Ile Ser
1      5      10

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Asn Pro Gly Val Gly Ile Gly Lys Gly Ser Gly Gly Cys Ala Ala Ala
20      25      30

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Ala Ala Ala Leu Ala Ala Arg Arg Phe Ser Ser Arg Thr Leu Leu Leu
35      40      45

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Leu Leu Leu Leu Leu Ala Ile Val Leu Pro Phe Ile Phe Val Arg Phe
50      55      60

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## 14-03 wo.sequence listing.txt

Ala Phe Leu Val Leu Glu Ser Ala Ser Val Cys Asp Ser Pro Leu Asp  
 65 70 75 80  
 Cys Met Gly Leu Arg Leu Phe Arg Gly Gly Asp Thr Ser Leu Lys Ile  
 85 90 95  
 Gly Glu Glu Leu Thr Arg Ala Leu Val Glu Glu Thr Thr Asp His Gln  
 100 105 110  
 Asp Val Asn Gly Arg Gly Thr Lys Gly Ser Leu Glu Ser Phe Asp Asp  
 115 120 125  
 Leu Val Lys Glu Met Thr Leu Lys Arg Arg Asp Ile Arg Ala Phe Ala  
 130 135 140  
 Ser Val Thr Lys Lys Met Leu Leu Gln Met Glu Arg Lys Val Gln Ser  
 145 150 155 160  
 Ala Lys His His Glu Leu Val Tyr Trp His Leu Ala Ser His Gly Ile  
 165 170 175  
 Pro Lys Ser Leu His Cys Leu Ser Leu Arg Leu Thr Glu Glu Tyr Ser  
 180 185 190  
 Val Asn Ala Met Ala Arg Met Arg Leu Pro Pro Pro Glu Ser Val Ser  
 195 200 205  
 Arg Leu Thr Asp Pro Ser Phe His His Ile Val Leu Leu Thr Asp Asn  
 210 215 220  
 Val Leu Ala Ala Ser Val Val Ile Ser Ser Thr Val Gln Asn Ala Val  
 225 230 235 240  
 Asn Pro Glu Lys Phe Val Phe His Ile Val Thr Asp Lys Lys Thr Tyr  
 245 250 255  
 Thr Pro Met His Ala Trp Phe Ala Ile Asn Ser Ala Ser Ser Pro Val  
 260 265 270  
 Val Glu Val Lys Gly Leu His Gln Tyr Asp Trp Pro Gln Glu Val Asn  
 275 280 285  
 Phe Lys Val Arg Glu Met Leu Asp Ile His Arg Leu Ile Trp Arg Arg  
 290 295 300  
 His Tyr Gln Asn Leu Lys Asp Ser Asp Phe Ser Phe Val Glu Gly Thr  
 305 310 315 320

## 14-03 WO.sequence listing.txt

His Glu Gln Ser Leu Gln Ala Leu Asn Pro Ser Cys Leu Ala Leu Leu  
                   325                                  330                                  335  
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                   340                                  345                                  350  
 Ile Val Leu Leu Asp Asp Asp Val Val Val Gln Ser Asp Leu Ser Ser  
                   355                                  360                                  365  
 Leu Trp Glu Thr Asp Leu Asn Gly Lys Val Val Gly Ala Val Val Asp  
                   370                                  375                                  380  
 Ser Trp Cys Gly Asp Asn Cys Cys Pro Gly Arg Lys Tyr Lys Asp Tyr  
                   385                                  390                                  395                                  400  
 Phe Asn Phe Ser His Pro Leu Ile Ser Ser Asn Leu Val Gln Glu Asp  
                                   405                                  410                                  415  
 Cys Ala Trp Leu Ser Gly Met Asn Val Phe Asp Leu Lys Ala Trp Arg  
                   420                                  425                                  430  
 Gln Thr Asn Ile Thr Glu Ala Tyr Ser Thr Trp Leu Arg Leu Ser Val  
                   435                                  440                                  445  
 Arg Ser Gly Leu Gln Leu Trp Gln Pro Gly Ala Leu Pro Pro Thr Leu  
                   450                                  455                                  460  
 Leu Ala Phe Lys Gly Leu Thr Gln Ser Leu Glu Pro Ser Trp His Val  
                   465                                  470                                  475                                  480  
 Ala Gly Leu Gly Ser Arg Ser Val Lys Ser Pro Gln Glu Ile Leu Lys  
                                   485                                  490                                  495  
 Ser Ala Ser Val Leu His Phe Ser Gly Pro Ala Lys Pro Trp Leu Glu  
                   500                                  505                                  510  
 Ile Ser Asn Pro Glu Val Arg Ser Leu Trp Tyr Arg Tyr Val Asn Ser  
                   515                                  520                                  525  
 Ser Asp Ile Phe Val Arg Lys Cys Lys Ile Met Asn  
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 <212> DNA  
 <213> Arabidopsis thaliana  
 <400> 25

## 14-03 WO.sequence listing.txt

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gatccagatc tgaaagatgt gaacatagtt gcgacataca gtgaccatta cggcaatata	240
cgccttggtg gggtgaaaat gggggatctt tcaccttctt gggttttgga gaatcctgcc	300
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gagcagatgc aagaagcagc cattcagaag tcaatgagct ttgaaaactc agtcataggg	600
aaatacagta tatggaggag agactatgag agcccaaag ctgatgctat cttgaagctt	660
atgagagacc agatcataat ggcaaaagca tatgcaaata ttgccaatc aaaaaatgta	720
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gcactctctc ttgcaaaaga cgagttatat gactgccatg aacttgcaaa aaagttccgg	900
gccatccttc agtccactga acgcaaagta gatggactga agaaaaaggg aaccttctta	960
attcagctag ctgccaaaac atttccaag ccattgcatt gcctgagtct gcagctagcg	1020
gcagactatt ttattctagg tttcaatgaa gaggatgcag tgaaagagga tgtcagtcaa	1080
aagaagcttg aagatccttc gctctatcac tatgcatct tttcggataa cgttctggct	1140
acatcagtg tggtgaactc cactgtcttg aatgcaaagg aaccgcagag gcatgtgttc	1200
catatagtaa ctgacaaact gaattttggt gcaatgaaga tgtggtttcg catcaatgct	1260
cctgctgatg cgacgattca agttgaaaac ataatgatt tcaagtggct gaactcctct	1320
tactgctctg ttctacggca gcttgaatct gcaaggctga agaatacta tttcaaagca	1380
aatcatcctt catcaatctc agctggcgca gataatctaa agtaccgcaa cccaagtat	1440
ctatcgatgc tgaatcatct cagattctac cttcctgagg tttatccgaa gctggagaag	1500
attctgtttc tagacgatga cattgtggtg cagaaggacc tggcaccact atgggaaata	1560
gacatgcaag gaaaagtga tggtgcggtg gagacgtgca aggagagctt ccacagattt	1620
gacaagtacc tcaacttctc aaatccaaag atttcagaga attttgacgc tgggtgcttg	1680
gggtgggcat ttgggatgaa tatgtttgac ctgaaagagt ggaggaaacg gaacattaca	1740
gggatatatc actattggca agacttgaat gaagacagaa cactgtggaa gctgggatcg	1800
ttgccaccgg ggctgataac attttacaac ctgacgtatg caatggatag gagctggcac	1860
gtactagggc tgggatatga cccagcgcta aaccaaacag caatagagaa tgcagcggtg	1920

## 14-03 WO.sequence listing.txt

gtgcattaca atgggaacta caagccatgg ctgggttttag cattcgccaa gtacaaaccg 1980  
 tactggtcca agtacgttga gtacgacaac ccttatctcc gacggtgcga catcaatgaa 2040  
 tga 2043

<210> 26  
 <211> 680  
 <212> PRT  
 <213> Arabidopsis thaliana

<400> 26

Met Thr Thr Phe Ser Thr Cys Ala Ala Phe Leu Ser Leu Val Val Val  
 1 5 10 15

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 20 25 30

His Arg Glu Leu Lys Ala Tyr Arg Pro Leu Gln Asp Asn Asn Leu Gln  
 35 40 45

Glu Val Tyr Ala Ser Ser Ala Ala Ala Val His Tyr Asp Pro Asp Leu  
 50 55 60

Lys Asp Val Asn Ile Val Ala Thr Tyr Ser Asp His Tyr Gly Asn Ile  
 65 70 75 80

Arg Leu Gly Arg Val Lys Met Gly Asp Leu Ser Pro Ser Trp Val Leu  
 85 90 95

Glu Asn Pro Ala Tyr Gln Val Ser Arg Lys Thr Lys Gly Ser Gln Leu  
 100 105 110

Val Ile Pro Arg Asp Ser Phe Gln Asn Asp Thr Gly Met Glu Asp Asn  
 115 120 125

Ala Ser His Ser Thr Thr Asn Gln Thr Asp Glu Ser Glu Asn Gln Phe  
 130 135 140

Pro Asn Val Asp Phe Ala Ser Pro Ala Lys Leu Lys Arg Gln Ile Leu  
 145 150 155 160

Arg Gln Glu Arg Arg Gly Gln Arg Thr Leu Glu Leu Ile Arg Gln Glu  
 165 170 175

Lys Glu Thr Asp Glu Gln Met Gln Glu Ala Ala Ile Gln Lys Ser Met  
 180 185 190

## 14-03 WO.sequence listing.txt

Ser Phe Glu Asn Ser Val Ile Gly Lys Tyr Ser Ile Trp Arg Arg Asp  
 195 200 205  
 Tyr Glu Ser Pro Asn Ala Asp Ala Ile Leu Lys Leu Met Arg Asp Gln  
 210 215 220  
 Ile Ile Met Ala Lys Ala Tyr Ala Asn Ile Ala Lys Ser Lys Asn Val  
 225 230 235 240  
 Thr Asn Leu Tyr Val Phe Leu Met Gln Gln Cys Gly Glu Asn Lys Arg  
 245 250 255  
 Val Ile Gly Lys Ala Thr Ser Asp Ala Asp Leu Pro Ser Ser Ala Leu  
 260 265 270  
 Asp Gln Ala Lys Ala Met Gly His Ala Leu Ser Leu Ala Lys Asp Glu  
 275 280 285  
 Leu Tyr Asp Cys His Glu Leu Ala Lys Lys Phe Arg Ala Ile Leu Gln  
 290 295 300  
 Ser Thr Glu Arg Lys Val Asp Gly Leu Lys Lys Lys Gly Thr Phe Leu  
 305 310 315 320  
 Ile Gln Leu Ala Ala Lys Thr Phe Pro Lys Pro Leu His Cys Leu Ser  
 325 330 335  
 Leu Gln Leu Ala Ala Asp Tyr Phe Ile Leu Gly Phe Asn Glu Glu Asp  
 340 345 350  
 Ala Val Lys Glu Asp Val Ser Gln Lys Lys Leu Glu Asp Pro Ser Leu  
 355 360 365  
 Tyr His Tyr Ala Ile Phe Ser Asp Asn Val Leu Ala Thr Ser Val Val  
 370 375 380  
 Val Asn Ser Thr Val Leu Asn Ala Lys Glu Pro Gln Arg His Val Phe  
 385 390 395 400  
 His Ile Val Thr Asp Lys Leu Asn Phe Gly Ala Met Lys Met Trp Phe  
 405 410 415  
 Arg Ile Asn Ala Pro Ala Asp Ala Thr Ile Gln Val Glu Asn Ile Asn  
 420 425 430  
 Asp Phe Lys Trp Leu Asn Ser Ser Tyr Cys Ser Val Leu Arg Gln Leu  
 435 440 445

## 14-03 WO.sequence listing.txt

Glu Ser Ala Arg Leu Lys Glu Tyr Tyr Phe Lys Ala Asn His Pro Ser  
 450 455 460  
 Ser Ile Ser Ala Gly Ala Asp Asn Leu Lys Tyr Arg Asn Pro Lys Tyr  
 465 470 475 480  
 Leu Ser Met Leu Asn His Leu Arg Phe Tyr Leu Pro Glu Val Tyr Pro  
 485 490 495  
 Lys Leu Glu Lys Ile Leu Phe Leu Asp Asp Asp Ile Val Val Gln Lys  
 500 505  
 Asp Leu Ala Pro Leu Trp Glu Ile Asp Met Gln Gly Lys Val Asn Gly  
 515 520 525  
 Ala Val Glu Thr Cys Lys Glu Ser Phe His Arg Phe Asp Lys Tyr Leu  
 530 535 540  
 Asn Phe Ser Asn Pro Lys Ile Ser Glu Asn Phe Asp Ala Gly Ala Cys  
 545 550 555 560  
 Gly Trp Ala Phe Gly Met Asn Met Phe Asp Leu Lys Glu Trp Arg Lys  
 565 570 575  
 Arg Asn Ile Thr Gly Ile Tyr His Tyr Trp Gln Asp Leu Asn Glu Asp  
 580 585 590  
 Arg Thr Leu Trp Lys Leu Gly Ser Leu Pro Pro Gly Leu Ile Thr Phe  
 595 600 605  
 Tyr Asn Leu Thr Tyr Ala Met Asp Arg Ser Trp His Val Leu Gly Leu  
 610 615 620  
 Gly Tyr Asp Pro Ala Leu Asn Gln Thr Ala Ile Glu Asn Ala Ala Val  
 625 630 635 640  
 Val His Tyr Asn Gly Asn Tyr Lys Pro Trp Leu Gly Leu Ala Phe Ala  
 645 650 655  
 Lys Tyr Lys Pro Tyr Trp Ser Lys Tyr Val Glu Tyr Asp Asn Pro Tyr  
 660 665 670  
 Leu Arg Arg Cys Asp Ile Asn Glu  
 675 680

<210> 27  
 <211> 1599

## 14-03 WO.sequence listing.txt

&lt;212&gt; DNA

<213> *Arabidopsis thaliana*

&lt;400&gt; 27

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attgacttga tgaagatcaa ggtcgcagct cgtcacatct cttaccgaac tctcttccac    120
accatcttaa tcctcgcttt cttgttgctt tttgttttca ttctcaccgc tgttggttacc    180
cttgagggtg tcaacaaatg ctctccatt gattgtttag ggaggcggat aggtccacgt     240
cttcttggtg gggtagatga ttcagagaga ctagctagag actttttataa aattctaaac     300
gaagtaagca ctcaagaaat tccagatggg ttgaagcttc caaattcttt tagtcaactt     360
gtttccgata tgaagaataa ccactatgat gcaaaaacat ttgctcttgt gctgcgagcc     420
atgatggaga agtttgaacg tgatatgagg gaatcgaaat ttgcagaact tatgaacaag     480
cactttgcag caagttccat tcccaaaggc attcattgtc tctctctaag actgacagat     540
gaatattcct ccaatgctca tgctcgaaga cagcttcctt caccagagtt tctccctgtt     600
ctttcagata atgcttacca ccactttatt ttgtccacgg acaatatattt ggctgcctca     660
gttggtggtc catccgctgt tcagtcatct tcaaaacccg agaaaattgt ctttcacatc     720
attacagaca agaaaaccta tgcgggtatg cattcatggg ttgcgcttaa ttctgttgca     780
ccagcaattg ttgagggtta aggtgttcat cagtttgact gggtgacgag agagaatgtt     840
ccggttttgg aagctgtgga aagccataat ggtgtcaggg actattatca tgggaatcat     900
gtcgcgtggg caaacctcac cgaaacaact cctcgaacat ttgcttcaaa attgcagtct     960
agaagtccaa aatacatatc tttgctcaac catcttagaa tatatatacc agagcttttc    1020
ccgaacttgg acaagggtgg tttcttagac gatgatatag ttgtccaggg agacttaact    1080
ccactttggg atgttgacct cggtggttaag gtcaatgggg cagtagagac ttgcaggggt    1140
gaagatgaat ggggtgatgt aaagcgttta aggaactact tcaatttctc tcaccgctc     1200
atcgcaaagc atttagatcc tgaagaatgt gcttgggcat atggtatgaa tatcttcgat     1260
ctacaagctt ggaggaaaac aaatatcaga gaaacgtatc actcttggct tagagagaat     1320
ctaaagtcaa atctgacaat gtggaaactt ggaaccttgc ctctgctct tatcgcgttc     1380
aagggtcacg tacacataat agactcgtca tggcatatgc taggattagg ctaccagagc     1440
aagaccaaca tagaaaatgt gaagaaagca gcagtgatcc actacaatgg gcagtcaaag     1500
ccatggctgg agattggttt cgagcatctg cggccattct ggaccaaata cgtcaactac     1560
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&lt;210&gt; 28

&lt;211&gt; 532

&lt;212&gt; PRT

<213> *Arabidopsis thaliana*

## 14-03 WO.sequence listing.txt

&lt;400&gt; 28

Met Gln Leu His Ile Ser Pro Ser Met Arg Ser Ile Thr Ile Ser Ser  
 1 5 10 15  
 Ser Asn Glu Phe Ile Asp Leu Met Lys Ile Lys Val Ala Ala Arg His  
 20 25 30  
 Ile Ser Tyr Arg Thr Leu Phe His Thr Ile Leu Ile Leu Ala Phe Leu  
 35 40 45  
 Leu Pro Phe Val Phe Ile Leu Thr Ala Val Val Thr Leu Glu Gly Val  
 50 55 60  
 Asn Lys Cys Ser Ser Ile Asp Cys Leu Gly Arg Arg Ile Gly Pro Arg  
 65 70 75 80  
 Leu Leu Gly Arg Val Asp Asp Ser Glu Arg Leu Ala Arg Asp Phe Tyr  
 85 90 95  
 Lys Ile Leu Asn Glu Val Ser Thr Gln Glu Ile Pro Asp Gly Leu Lys  
 100 105 110  
 Leu Pro Asn Ser Phe Ser Gln Leu Val Ser Asp Met Lys Asn Asn His  
 115 120 125  
 Tyr Asp Ala Lys Thr Phe Ala Leu Val Leu Arg Ala Met Met Glu Lys  
 130 135 140  
 Phe Glu Arg Asp Met Arg Glu Ser Lys Phe Ala Glu Leu Met Asn Lys  
 145 150 155 160  
 His Phe Ala Ala Ser Ser Ile Pro Lys Gly Ile His Cys Leu Ser Leu  
 165 170 175  
 Arg Leu Thr Asp Glu Tyr Ser Ser Asn Ala His Ala Arg Arg Gln Leu  
 180 185 190  
 Pro Ser Pro Glu Phe Leu Pro Val Leu Ser Asp Asn Ala Tyr His His  
 195 200 205  
 Phe Ile Leu Ser Thr Asp Asn Ile Leu Ala Ala Ser Val Val Val Ser  
 210 215 220  
 Ser Ala Val Gln Ser Ser Ser Lys Pro Glu Lys Ile Val Phe His Ile  
 225 230 235 240



## 14-03 WO.sequence listing.txt

Ile Thr Asp Lys Lys Thr Tyr Ala Gly Met His Ser Trp Phe Ala Leu  
 245 250 255  
 Asn Ser Val Ala Pro Ala Ile Val Glu Val Lys Gly Val His Gln Phe  
 260 265 270  
 Asp Trp Leu Thr Arg Glu Asn Val Pro Val Leu Glu Ala Val Glu Ser  
 275 280 285  
 His Asn Gly Val Arg Asp Tyr Tyr His Gly Asn His Val Ala Gly Ala  
 290 295 300  
 Asn Leu Thr Glu Thr Thr Pro Arg Thr Phe Ala Ser Lys Leu Gln Ser  
 305 310 315  
 Arg Ser Pro Lys Tyr Ile Ser Leu Leu Asn His Leu Arg Ile Tyr Ile  
 325 330 335  
 Pro Glu Leu Phe Pro Asn Leu Asp Lys Val Val Phe Leu Asp Asp Asp  
 340 345 350  
 Ile Val Val Gln Gly Asp Leu Thr Pro Leu Trp Asp Val Asp Leu Gly  
 355 360 365  
 Gly Lys Val Asn Gly Ala Val Glu Thr Cys Arg Gly Glu Asp Glu Trp  
 370 375 380  
 Val Met Ser Lys Arg Leu Arg Asn Tyr Phe Asn Phe Ser His Pro Leu  
 385 390 395 400  
 Ile Ala Lys His Leu Asp Pro Glu Glu Cys Ala Trp Ala Tyr Gly Met  
 405 410 415  
 Asn Ile Phe Asp Leu Gln Ala Trp Arg Lys Thr Asn Ile Arg Glu Thr  
 420 425 430  
 Tyr His Ser Trp Leu Arg Glu Asn Leu Lys Ser Asn Leu Thr Met Trp  
 435 440 445  
 Lys Leu Gly Thr Leu Pro Pro Ala Leu Ile Ala Phe Lys Gly His Val  
 450 455 460  
 His Ile Ile Asp Ser Ser Trp His Met Leu Gly Leu Gly Tyr Gln Ser  
 465 470 475 480  
 Lys Thr Asn Ile Glu Asn Val Lys Lys Ala Ala Val Ile His Tyr Asn  
 485 490 495

## 14-03 WO.sequence listing.txt

Gly Gln Ser Lys Pro Trp Leu Glu Ile Gly Phe Glu His Leu Arg Pro  
                   500                                  505                                  510

Phe Trp Thr Lys Tyr Val Asn Tyr Ser Asn Asp Phe Ile Lys Asn Cys  
           515                                  520                                  525

His Ile Leu Glu  
       530

<210> 29  
 <211> 1608  
 <212> DNA  
 <213> Arabidopsis thaliana

<400> 29  
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 tcttactct tcttacttt tcttctccga ttcgtctttg ttctctccac cgttgatact 180  
 atcgacggcg atccctctcc ttgctcctct cttgcttgct tggggaaaag actaaagcca 240  
 aagcttttag gaagaagggg tgattctggt aatgttccag aagctatgta ccaagtttta 300  
 gaacagcctt taagcgaaca agaactcaaa ggaagatcag atatacctca aacacttcaa 360  
 gatttcatgt ctgaagtcaa aagaagcaaa tcagacgcaa gagaatttgc tcaaaagcta 420  
 aaagaaatgg tgacattgat ggaacagaga acaagaacgg ctaagattca agagtattta 480  
 tatcgacatg tcgcatcaag cagcataccg aaacaacttc actgttttagc tcttaaacta 540  
 gccaacgaac actcgataaa cgcagcggcg cgtctccagc ttccagaagc tgagcttgtc 600  
 cctatgttgg tagacaacaa ctactttcac tttgtcttgg cttcagacaa tattcttgca 660  
 gcttcggttg tggctaagtc gttggttcaa aatgctttta gacctcataa gatcgttctt 720  
 cacatcataa cggataggaa aacttatttc ccaatgcaag cttgggttctc attgcatcct 780  
 ctgtctccag caataattga ggtcaaggct ttgcatcatt tcgattgggt atcgaaaggt 840  
 aaagtacccg ttttgggaagc tatggagaaa gatcagagag tgaggtctca attcagaggt 900  
 ggatcatcgg ttattgtggc taataacaaa gagaacccgg ttgttggtgc tgctaagtta 960  
 caagctctca gccctaaata caactccttg atgaatcaca tccgtattca tctaccagag 1020  
 ttgtttccaa gcttaacaa ggttgtgttt ctagacgatg acattgtgat ccaaactgat 1080  
 ctttcacctc tttgggacat tgacatgaat ggaaaagtaa atggagcagt ggaaacatgt 1140  
 agaggagaag acaagtttgt gatgtcaaag aagttcaaga gttacctcaa cttctcgaat 1200  
 ccgacaattg ccaaaaactt caatccagag gaatgtgcat gggcttatgg aatgaatgtt 1260  
 ttcgacctag cggcttgag gaggactaac ataagctcca cttactatca ttggcttgac 1320

## 14-03 WO.sequence listing.txt

gagaacttaa aatcagacct gagtttgtgg cagctgggaa ctttgccctcc tgggctgatt 1380  
 gctttccacg gtcattgtcca aaccatagat ccgttctggc atatgcttgg tctcggatac 1440  
 caagagacca cgagctatgc cgatgctgaa agtgccgctg ttgttcattt caatggaaga 1500  
 gctaagcctt ggctggatat agcatttcct catctacgtc ctctctgggc taagtatctt 1560  
 gattcttctg acagatttat caagagctgt cacattagag catcatga 1608

<210> 30  
 <211> 535  
 <212> PRT  
 <213> Arabidopsis thaliana

<400> 30

Met Gln Leu His Ile Ser Pro Ser Leu Arg His Val Thr Val Val Thr  
 1 5 10 15

Gly Lys Gly Leu Arg Glu Phe Ile Lys Val Lys Val Gly Ser Arg Arg  
 20 25 30

Phe Ser Tyr Gln Met Val Phe Tyr Ser Leu Leu Phe Phe Thr Phe Leu  
 35 40 45

Leu Arg Phe Val Phe Val Leu Ser Thr Val Asp Thr Ile Asp Gly Asp  
 50 55 60

Pro Ser Pro Cys Ser Ser Leu Ala Cys Leu Gly Lys Arg Leu Lys Pro  
 65 70 75 80

Lys Leu Leu Gly Arg Arg Val Asp Ser Gly Asn Val Pro Glu Ala Met  
 85 90 95

Tyr Gln Val Leu Glu Gln Pro Leu Ser Glu Gln Glu Leu Lys Gly Arg  
 100 105 110

Ser Asp Ile Pro Gln Thr Leu Gln Asp Phe Met Ser Glu Val Lys Arg  
 115 120 125

Ser Lys Ser Asp Ala Arg Glu Phe Ala Gln Lys Leu Lys Glu Met Val  
 130 135 140

Thr Leu Met Glu Gln Arg Thr Arg Thr Ala Lys Ile Gln Glu Tyr Leu  
 145 150 155 160

Tyr Arg His Val Ala Ser Ser Ser Ile Pro Lys Gln Leu His Cys Leu  
 165 170 175

Ala Leu Lys Leu Ala Asn Glu His Ser Ile Asn Ala Ala Ala Arg Leu

## 14-03 WO.sequence listing.txt

180

185

190

Gln Leu Pro Glu Ala Glu Leu Val Pro Met Leu Val Asp Asn Asn Tyr  
 195 200 205  
 Phe His Phe Val Leu Ala Ser Asp Asn Ile Leu Ala Ala Ser Val Val  
 210 215 220  
 Ala Lys Ser Leu Val Gln Asn Ala Leu Arg Pro His Lys Ile Val Leu  
 225 230 235 240  
 His Ile Ile Thr Asp Arg Lys Thr Tyr Phe Pro Met Gln Ala Trp Phe  
 245 250 255  
 Ser Leu His Pro Leu Ser Pro Ala Ile Ile Glu Val Lys Ala Leu His  
 260 265 270  
 His Phe Asp Trp Leu Ser Lys Gly Lys Val Pro Val Leu Glu Ala Met  
 275 280 285  
 Glu Lys Asp Gln Arg Val Arg Ser Gln Phe Arg Gly Gly Ser Ser Val  
 290 295 300  
 Ile Val Ala Asn Asn Lys Glu Asn Pro Val Val Val Ala Ala Lys Leu  
 305 310 315 320  
 Gln Ala Leu Ser Pro Lys Tyr Asn Ser Leu Met Asn His Ile Arg Ile  
 325 330 335  
 His Leu Pro Glu Leu Phe Pro Ser Leu Asn Lys Val Val Phe Leu Asp  
 340 345 350  
 Asp Asp Ile Val Ile Gln Thr Asp Leu Ser Pro Leu Trp Asp Ile Asp  
 355 360 365  
 Met Asn Gly Lys Val Asn Gly Ala Val Glu Thr Cys Arg Gly Glu Asp  
 370 375 380  
 Lys Phe Val Met Ser Lys Lys Phe Lys Ser Tyr Leu Asn Phe Ser Asn  
 385 390 395 400  
 Pro Thr Ile Ala Lys Asn Phe Asn Pro Glu Glu Cys Ala Trp Ala Tyr  
 405 410 415  
 Gly Met Asn Val Phe Asp Leu Ala Ala Trp Arg Arg Thr Asn Ile Ser  
 420 425 430

## 14-03 WO.sequence listing.txt

Ser Thr Tyr Tyr His Trp Leu Asp Glu Asn Leu Lys Ser Asp Leu Ser  
 435 440 445

Leu Trp Gln Leu Gly Thr Leu Pro Pro Gly Leu Ile Ala Phe His Gly  
 450 455 460

His Val Gln Thr Ile Asp Pro Phe Trp His Met Leu Gly Leu Gly Tyr  
 465 470 475 480

Gln Glu Thr Thr Ser Tyr Ala Asp Ala Glu Ser Ala Ala Val Val His  
 485 490 495

Phe Asn Gly Arg Ala Lys Pro Trp Leu Asp Ile Ala Phe Pro His Leu  
 500 505 510

Arg Pro Leu Trp Ala Lys Tyr Leu Asp Ser Ser Asp Arg Phe Ile Lys  
 515 520 525

Ser Cys His Ile Arg Ala Ser  
 530 535

<210> 31  
 <211> 1086  
 <212> DNA  
 <213> Arabidopsis thaliana

<400> 31  
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 gacgaattca aacccaaca aaactccgat tactcctcct tcagagaatc tccaatgttc 180  
 cgtaacgccg aacaatgcag atcttccggc gaagattccg gcgctctgtaa ccctaattctc 240  
 gtccacgtag ccatcactct cgacatcgat tacctccgtg gctcaatcgc agccgtcaat 300  
 tcgatcctcc agcactcaat gtgccctcaa agcgtcttct tccacttcct cgtctcctcc 360  
 jagtctcaaa acctagaatc tctgattcgt tctactttcc ccaaattgac gaatctcaaa 420  
 atttactatt ttgcccctga gaccgtacag tctttgattt catcttccgt gagacaagcc 480  
 ttagagcaac cgttgaatta cgccagaaat tacttggcgg atctgctcga gccttgcggtt 540  
 aagcgagtca tctacttgga ttcggatctc gtcgctcgtc atgatatcgt caagctttgg 600  
 aaacggggtt taggccagag aacaatcgga gctccggagt attgtcacgc gaatttcacg 660  
 aaatacttca ccggagggtt ttggtcagat aagagggtta acgggacgtt caaaggagg 720  
 iacccttggt acttcaatac tgggtgtaatg gtgattgatt tgaagaagtg gagacaattt 780  
 iaggttcacga aacgaattga gaaatggatg gagattcaga agatagagag gatttatgag 840  
 :ttggttctc ttcctccgtt tcttctggta tttgctggtc atgtagctcc gatttcacat 900

## 14-03 WO.sequence listing.txt

cgggtggaatc aacatgggct tgggtggtgat aatgttagag gtagttgccg tgatttgcac 960  
 tctgggtcctg tgagtttgct tcactgggtca ggtagtggta agccatgggt aagactcgat 1020  
 tccaagcttc catgtccttt agacacattg tgggcacctt atgatttgta taaacactcc 1080  
 cattga 1086

<210> 32  
 <211> 361  
 <212> PRT  
 <213> Arabidopsis thaliana

<400> 32

Met His Trp Ile Thr Arg Phe Ser Ala Phe Phe Ser Ala Ala Leu Ala  
 1 5 10 15

Met Ile Leu Leu Ser Pro Ser Leu Gln Ser Phe Ser Pro Ala Ala Ala  
 20 25 30

Ile Arg Ser Ser His Pro Tyr Ala Asp Glu Phe Lys Pro Gln Gln Asn  
 35 40 45

Ser Asp Tyr Ser Ser Phe Arg Glu Ser Pro Met Phe Arg Asn Ala Glu  
 50 55 60

Gln Cys Arg Ser Ser Gly Glu Asp Ser Gly Val Cys Asn Pro Asn Leu  
 65 70 75 80

Val His Val Ala Ile Thr Leu Asp Ile Asp Tyr Leu Arg Gly Ser Ile  
 85 90 95

Ala Ala Val Asn Ser Ile Leu Gln His Ser Met Cys Pro Gln Ser Val  
 100 105 110

Phe Phe His Phe Leu Val Ser Ser Glu Ser Gln Asn Leu Glu Ser Leu  
 115 120 125

Ile Arg Ser Thr Phe Pro Lys Leu Thr Asn Leu Lys Ile Tyr Tyr Phe  
 130 135 140

Ala Pro Glu Thr Val Gln Ser Leu Ile Ser Ser Ser Val Arg Gln Ala  
 145 150 155 160

Leu Glu Gln Pro Leu Asn Tyr Ala Arg Asn Tyr Leu Ala Asp Leu Leu  
 165 170 175

Glu Pro Cys Val Lys Arg Val Ile Tyr Leu Asp Ser Asp Leu Val Val  
 180 185 190

## 14-03 WO.sequence listing.txt

Val Asp Asp Ile Val Lys Leu Trp Lys Thr Gly Leu Gly Gln Arg Thr  
           195                          200                          205  
 Ile Gly Ala Pro Glu Tyr Cys His Ala Asn Phe Thr Lys Tyr Phe Thr  
           210                          215                          220  
 Gly Gly Phe Trp Ser Asp Lys Arg Phe Asn Gly Thr Phe Lys Gly Arg  
           225                          230                          235                          240  
 Asn Pro Cys Tyr Phe Asn Thr Gly Val Met Val Ile Asp Leu Lys Lys  
                           245                          250  
 Trp Arg Gln Phe Arg Phe Thr Lys Arg Ile Glu Lys Trp Met Glu Ile  
                           260                          265                          270  
 Gln Lys Ile Glu Arg Ile Tyr Glu Leu Gly Ser Leu Pro Pro Phe Leu  
                           275                          280                          285  
 Leu Val Phe Ala Gly His Val Ala Pro Ile Ser His Arg Trp Asn Gln  
           290                          295                          300  
 His Gly Leu Gly Gly Asp Asn Val Arg Gly Ser Cys Arg Asp Leu His  
           305                          310                          315                          320  
 Ser Gly Pro Val Ser Leu Leu His Trp Ser Gly Ser Gly Lys Pro Trp  
                           325                          330                          335  
 Leu Arg Leu Asp Ser Lys Leu Pro Cys Pro Leu Asp Thr Leu Trp Ala  
                           340                          345                          350  
 Pro Tyr Asp Leu Tyr Lys His Ser His  
           355                          360

<210> 33  
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 <212> DNA  
 <213> Arabidopsis thaliana

<400> 33  
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 jtcacagtca ctctcactga cctccccgcg tttcgtgaag ctccggcggt tcgaaacggc 120  
 igagaatgct ccaaaacgac atggatacct tcggatcacg aacacaaccc atcaatcatc 180  
 :acatcgcta tgactctcga cgcaatttac ctccgtggct cagtcgccgg cgtcttctcc 240  
 ittctccaac acgcttcttg tcctgaaaac atcgttttcc acttcatcgc cactcaccgt 300  
 :gcagcgccg atctccgccg cataatctcc tcaacattcc catacctaac ctaccacatt 360

## 14-03 WO.sequence listing.txt

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taccattttg accctaacct cgtccgcagc aaaatatctt cctctattcg tcgtgcttta 420
gaccaaccgt taaactacgc tcggatctac ctcgccgatc tcctcccaat cgccgtccgc 480
cgcgtaatct acttcgactc cgatctcgta gtcgtcgatg acgtggctaa actctggaga 540
atcgatctac gtcggcacgt cgtcggagct ccggagtact gtcacgcgaa ttctactaac 600
tactttactt caagattctg gtcgagtcaa ggttacaaat cggcgttgaa agataggaaa 660
ccgtgttatt tcaacaccgg agtgatggtg attgatctcg gaaaatggag agaaaggaga 720
gtcacggtga agctagagac atggatgagg attcaaaaac gacatcgtat ttacgaattg 780
ggatctttgc ctccgtttct gctcgttttc gccggagatg ttgagccggt ggagcatagg 840
tggaatcagc atgggtcttg tggtgataac ttggaaggac ttgcccggaa ttgcatcca 900
gggccggtga gtttgttgca ttggagcggg aaagggaaac catggctaag gcttgactcg 960
agacgaccgt gtccgttga ttcgttatgg gtccttatg atttgtttcg ttattcaccg 1020
ttgatctctg atagctga 1038

```

```

<210> 34
<211> 345
<212> PRT
<213> Arabidopsis thaliana

```

```

<400> 34

```

```

Met Ser Ser Leu Arg Leu Arg Leu Cys Leu Leu Leu Leu Leu Pro Ile
1          5          10          15

```

```

Thr Ile Ser Cys Val Thr Val Thr Leu Thr Asp Leu Pro Ala Phe Arg
20          25          30

```

```

Glu Ala Pro Ala Phe Arg Asn Gly Arg Glu Cys Ser Lys Thr Thr Trp
35          40          45

```

```

Ile Pro Ser Asp His Glu His Asn Pro Ser Ile Ile His Ile Ala Met
50          55          60

```

```

Thr Leu Asp Ala Ile Tyr Leu Arg Gly Ser Val Ala Gly Val Phe Ser
55          70          75          80

```

```

Val Leu Gln His Ala Ser Cys Pro Glu Asn Ile Val Phe His Phe Ile
85          90          95

```

```

Ala Thr His Arg Arg Ser Ala Asp Leu Arg Arg Ile Ile Ser Ser Thr
100         105         110

```

```

Phe Pro Tyr Leu Thr Tyr His Ile Tyr His Phe Asp Pro Asn Leu Val
115        120        125

```



## 14-03 WO.sequence listing.txt

Arg Ser Lys Ile Ser Ser Ser Ile Arg Arg Ala Leu Asp Gln Pro Leu  
 130 135 140  
 Asn Tyr Ala Arg Ile Tyr Leu Ala Asp Leu Leu Pro Ile Ala Val Arg  
 145 150 155 160  
 Arg Val Ile Tyr Phe Asp Ser Asp Leu Val Val Val Asp Asp Val Ala  
 165 170 175  
 Lys Leu Trp Arg Ile Asp Leu Arg Arg His Val Val Gly Ala Pro Glu  
 180 185 190  
 Tyr Cys His Ala Asn Phe Thr Asn Tyr Phe Thr Ser Arg Phe Trp Ser  
 195 200 205  
 Ser Gln Gly Tyr Lys Ser Ala Leu Lys Asp Arg Lys Pro Cys Tyr Phe  
 210 215 220  
 Asn Thr Gly Val Met Val Ile Asp Leu Gly Lys Trp Arg Glu Arg Arg  
 225 230 235 240  
 Val Thr Val Lys Leu Glu Thr Trp Met Arg Ile Gln Lys Arg His Arg  
 245 250 255  
 Ile Tyr Glu Leu Gly Ser Leu Pro Pro Phe Leu Leu Val Phe Ala Gly  
 260 265 270  
 Asp Val Glu Pro Val Glu His Arg Trp Asn Gln His Gly Leu Gly Gly  
 275 280 285  
 Asp Asn Leu Glu Gly Leu Cys Arg Asn Leu His Pro Gly Pro Val Ser  
 290 295 300  
 Leu Leu His Trp Ser Gly Lys Gly Lys Pro Trp Leu Arg Leu Asp Ser  
 305 310 315 320  
 Arg Arg Pro Cys Pro Leu Asp Ser Leu Trp Ala Pro Tyr Asp Leu Phe  
 325 330 335  
 Arg Tyr Ser Pro Leu Ile Ser Asp Ser  
 340 345

<210> 35  
 <211> 1056  
 <212> DNA  
 <213> Arabidopsis thaliana

## 14-03 WO.sequence listing.txt

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<400> 35
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tccgccacta caattattca aaaattcaaa gaagccccac agttttacaa ttctgcagat 120
tgccccttaa tcgatgactc cgagtcggac gatgacgtgg tcgccaaacc aatcttctgc 180
tcacgtcgag ctgtccacgt ggcgatgaca ctcgacgccg cctacattcg tggctcagtc 240
gccgctgttc tctccgtcct ccaacactct tcttgtcctg aaaacattgt tttccacttc 300
gtcgccctctg cttccgccga cgcttcttcc ttacgagcca ccatatcctc ctctttccct 360
taccttgatt tcaccgtcta cgtcttcaac gtctcctccg tctctcgcct tatctcctcc 420
tctatccgct ccgcactaga ctgtccttta aactacgcaa gaagctacct cgccgatctc 480
ctccctccct gcgtccgccg cgctgtctac ctagactccg atctgacccg cgtcgacgac 540
atagcaaaac tcgccgccac agatctcggc cgtgattcag tcctcgccgc gccggaatac 600
tgcaacgcca atttcacttc atacttcaca tcaaccttct ggtctaatac gactctctct 660
ttaaccttcg ccgatcggaa agcatgctac ttcaactctg gagtcatggg gatcgatctt 720
tcccgggtggc gcgaaggcgc gtacacgtca cgcacgaag agtggatggc gatgcaaaag 780
agaatgagaa ttacgagct tggttcggtt ccaccgtttt tattggtttt tgccggtttg 840
attaaaccgg ttaatcatcg gtggaaccaa cacggtttag gaggtgataa ttccagagga 900
ctgtgtagag atctccatcc tgggtccggtg agtctgttgc attggagtgg gaaaggtaag 960
ccatgggcta ggcttgatgc tggtcggcct tgtcctttag acgcgctttg ggctccgtat 1020
gatcttcttc aaacgccgtt cgcgttggtat tcttga 1056

```

```

<210> 36
<211> 351
<212> PRT
<213> Arabidopsis thaliana

```

```

<400> 36

```

```

Met Ser Gln His Leu Leu Leu Leu Ile Leu Leu Ser Leu Leu Leu Leu
1           5           10           15

```

```

His Lys Pro Ile Ser Ala Thr Thr Ile Ile Gln Lys Phe Lys Glu Ala
20           25           30

```

```

Pro Gln Phe Tyr Asn Ser Ala Asp Cys Pro Leu Ile Asp Asp Ser Glu
35           40           45

```

```

Ser Asp Asp Asp Val Val Ala Lys Pro Ile Phe Cys Ser Arg Arg Ala
50           55           60

```

```

Val His Val Ala Met Thr Leu Asp Ala Ala Tyr Ile Arg Gly Ser Val
65           70           75           80

```

## 14-03 WO.sequence listing.txt

Ala Ala Val Leu Ser Val Leu Gln His Ser Ser Cys Pro Glu Asn Ile  
                   85                                  90                                  95  
 Val Phe His Phe Val Ala Ser Ala Ser Ala Asp Ala Ser Ser Leu Arg  
                   100                                  105                                  110  
 Ala Thr Ile Ser Ser Ser Phe Pro Tyr Leu Asp Phe Thr Val Tyr Val  
                   115                                  120                                  125  
 Phe Asn Val Ser Ser Val Ser Arg Leu Ile Ser Ser Ser Ile Arg Ser  
           130                                  135                                  140  
 Ala Leu Asp Cys Pro Leu Asn Tyr Ala Arg Ser Tyr Leu Ala Asp Leu  
   145                                  150                                  155                                  160  
 Leu Pro Pro Cys Val Arg Arg Val Val Tyr Leu Asp Ser Asp Leu Ile  
                   165                                  170                                  175  
 Leu Val Asp Asp Ile Ala Lys Leu Ala Ala Thr Asp Leu Gly Arg Asp  
                   180                                  185                                  190  
 Ser Val Leu Ala Ala Pro Glu Tyr Cys Asn Ala Asn Phe Thr Ser Tyr  
           195                                  200                                  205  
 Phe Thr Ser Thr Phe Trp Ser Asn Pro Thr Leu Ser Leu Thr Phe Ala  
           210                                  215                                  220  
 Asp Arg Lys Ala Cys Tyr Phe Asn Thr Gly Val Met Val Ile Asp Leu  
   225                                  230                                  235                                  240  
 Ser Arg Trp Arg Glu Gly Ala Tyr Thr Ser Arg Ile Glu Glu Trp Met  
                   245                                  250                                  255  
 Ala Met Gln Lys Arg Met Arg Ile Tyr Glu Leu Gly Ser Leu Pro Pro  
                   260                                  265                                  270  
 Phe Leu Leu Val Phe Ala Gly Leu Ile Lys Pro Val Asn His Arg Trp  
           275                                  280                                  285  
 Asn Gln His Gly Leu Gly Gly Asp Asn Phe Arg Gly Leu Cys Arg Asp  
           290                                  295                                  300  
 Leu His Pro Gly Pro Val Ser Leu Leu His Trp Ser Gly Lys Gly Lys  
   305                                  310                                  315                                  320  
 Pro Trp Ala Arg Leu Asp Ala Gly Arg Pro Cys Pro Leu Asp Ala Leu

325 14-03 WO.sequence listing.txt 335  
330

Trp Ala Pro Tyr Asp Leu Leu Gln Thr Pro Phe Ala Leu Asp Ser  
340 345 350

<210> 37  
<211> 1182  
<212> DNA  
<213> Arabidopsis thaliana

<400> 37  
atgtcgtcgc gtttttcttt gacggtggtg tgtttgattg ctctgttacc gtttgttggt 60  
ggtatacggg tgattccggc gaggatcacg agtgtcgggt atggcggcgg cggaggagggt 120  
aataatgggt ttagtaaact tgggtccgttt atggaagctc cggagtatag aaacggcaag 180  
gagtgtgtat cttcatcagt gaacagagag aacttcgtgt cgtcttcttc tagttctaata 240  
gatccttcgc ttgttcacat cgctatgact ttggactcag agtatctccg tggatcaatc 300  
gcagccggtt attctgttct tcgccacgcg tcttgtccag agaacgtctt cttccatttc 360  
atcgtgctg agtttgactc tgcgagtcct cgtgttctga gtcaactcgt gaggtcgcact 420  
tttcttctcg tgaactttaa agtctacatt tttaggaag atacggtgat caatctcata 480  
tcttcttcga ttagactagc tttggagaat ccgttgaact atgctcggaa ctatctcggg 540  
gatattcttg atcgaagtgt tgaacgagtc atttatcttg actcggatgt tataactgtg 600  
gatgatatca caaagctttg gaacacgggt ttgaccgggt cacgagtcac cggagctccg 660  
gagtattgtc acgcgaactt cactcagtat ttcacttccg ggttctggtc agacccgggt 720  
ttaccgggtc taatctcggg tcaaaagcct tgctatttca acacaggagt gatggtgatg 780  
gatcttggtt gatggagaga aggaattac agagagaagt tagagcaatg gatgcaattg 840  
cagaagaaga tgagaatcta cgatcttggg tcattaccac cgtttctttt ggtgtttgcy 900  
ggtaatgttg aagctattga tcatagatgg aaccaacatg gtttaggagg agacaatata 960  
cgaggaagtt gtcgggtcatt gcatcctggt cctgtgagct tgttgcattg gagggtgaaa 1020  
ggtaagccat gggtttagact tgatgagaag aggccttgct cgttggatca tctttgggag 1080  
ccatatgatt tgtataagca taagattgag agagctaaag atcagtcctc gcttgggttt 1140  
gcttctctgt cggagttgac tgatgattca agcttcttgt ga 1182

<210> 38  
<211> 393  
<212> PRT  
<213> Arabidopsis thaliana

<400> 38

Met Ser Ser Arg Phe Ser Leu Thr Val Val Cys Leu Ile Ala Leu Leu  
1 5 10 15

## 14-03 WO.sequence listing.txt

```

Pro Phe Val Val Gly Ile Arg Leu Ile Pro Ala Arg Ile Thr Ser Val
      20      25      30
Gly Asp Gly Gly Gly Gly Gly Gly Asn Asn Gly Phe Ser Lys Leu Gly
      35      40      45
Pro Phe Met Glu Ala Pro Glu Tyr Arg Asn Gly Lys Glu Cys Val Ser
      50      55      60
Ser Ser Val Asn Arg Glu Asn Phe Val Ser Ser Ser Ser Ser Ser Asn
      65      70      75      80
Asp Pro Ser Leu Val His Ile Ala Met Thr Leu Asp Ser Glu Tyr Leu
      85      90      95
Arg Gly Ser Ile Ala Ala Val His Ser Val Leu Arg His Ala Ser Cys
      100      105      110
Pro Glu Asn Val Phe Phe His Phe Ile Ala Ala Glu Phe Asp Ser Ala
      115      120      125
Ser Pro Arg Val Leu Ser Gln Leu Val Arg Ser Thr Phe Pro Ser Leu
      130      135      140
Asn Phe Lys Val Tyr Ile Phe Arg Glu Asp Thr Val Ile Asn Leu Ile
      145      150      155      160
Ser Ser Ser Ile Arg Leu Ala Leu Glu Asn Pro Leu Asn Tyr Ala Arg
      165      170      175
Asn Tyr Leu Gly Asp Ile Leu Asp Arg Ser Val Glu Arg Val Ile Tyr
      180      185      190
Leu Asp Ser Asp Val Ile Thr Val Asp Asp Ile Thr Lys Leu Trp Asn
      195      200      205
Thr Val Leu Thr Gly Ser Arg Val Ile Gly Ala Pro Glu Tyr Cys His
      210      215      220
Ala Asn Phe Thr Gln Tyr Phe Thr Ser Gly Phe Trp Ser Asp Pro Ala
      225      230      235      240
Leu Pro Gly Leu Ile Ser Gly Gln Lys Pro Cys Tyr Phe Asn Thr Gly
      245      250      255
Val Met Val Met Asp Leu Val Arg Trp Arg Glu Gly Asn Tyr Arg Glu

```

## 14-03 WO.sequence listing.txt

260

265

270

Lys Leu Glu Gln Trp Met Gln Leu Gln Lys Lys Met Arg Ile Tyr Asp  
 275 280 285

Leu Gly Ser Leu Pro Pro Phe Leu Leu Val Phe Ala Gly Asn Val Glu  
 290 295 300

Ala Ile Asp His Arg Trp Asn Gln His Gly Leu Gly Gly Asp Asn Ile  
 305 310 315 320

Arg Gly Ser Cys Arg Ser Leu His Pro Gly Pro Val Ser Leu Leu His  
 325 330 335

Trp Ser Gly Lys Gly Lys Pro Trp Val Arg Leu Asp Glu Lys Arg Pro  
 340 345 350

Cys Pro Leu Asp His Leu Trp Glu Pro Tyr Asp Leu Tyr Lys His Lys  
 355 360 365

Ile Glu Arg Ala Lys Asp Gln Ser Leu Leu Gly Phe Ala Ser Leu Ser  
 370 375 380

Glu Leu Thr Asp Asp Ser Ser Phe Leu  
 385 390

<210> 39  
 <211> 1173  
 <212> DNA  
 <213> Arabidopsis thaliana

<400> 39  
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 attccactgt tttccgtcgg tatacggatg attccgggaa gactcaccgc cgtatccgcc 120  
 accgtcggaa atggctttga tctggggtcg ttcgtggaag ctccggagta cagaaacggc 180  
 aaggagtgcg tgtctcaatc gttgaacaga gaaaacttcg tgcgtcttg cgacgcttcg 240  
 ttagttcatg tagctatgac gcttgactcg gactacttac gtggctcaat cgcagccgta 300  
 cattcaatgc tccgccacgc gtcgtgtcca gaaaacgtct tcttccatct catcgctgca 360  
 gagtttgacc cggcgagtcc acgcgttctg agtcaactcg tccgatctac tttcccgtcg 420  
 ctaaacttca aagtctacat tttccgggaa gatacgggtga tcaaccttat ctcttcttca 480  
 atcagacaag ctttagagaa tccattgaac tatgctcggg actacctcgg agatattctt 540  
 gatccatgcg tagacagagt catttaccta gactcggaca tcatcgtcgt cgatgacata 600  
 acaaagcttt ggaacacgag tttgacaggg tcaagaatca tcggagctcc ggagtattgt 660

## 14-03 WO.sequence listing.txt

```

cacgctaact tcacaaagta cttcacttca ggtttctggt ccgacccggc ttaccggt      720
ttcttctcgg gtcgaaagcc ttgttatttc aacacgggtg tgatggtgat ggatctagtt      780
agatggagag aaggaaacta cagagaaaag cttgaaactt ggatgcagat acagaagaag      840
aagagaatct acgatttggg ttctttgcct ccgtttcttc ttgtcttcgc aggggaacgtt      900
gaagcaattg atcatagggtg gaaccaacat ggtttaggag gagacaatgt acgaggaagt      960
tgtaggtctt tgcataaagg accagtgagt ttgttgcatc ggagtggtaa aggtaagcca     1020
tgggtgagac ttgatgagaa gagaccgtgt ccgttggtatc atttatggga accgtatgat     1080
ttatatgagc ataagattga aagagctaaa gatcagtcctt tgttcgggtt ctcttctttg     1140
tctgagttaa cagaagattc aagctttttc tga                                     1173

```

<210> 40  
 <211> 390  
 <212> PRT  
 <213> Arabidopsis thaliana

<400> 40

Met Arg Leu Arg Phe Pro Met Lys Ser Ala Val Leu Ala Phe Ala Ile  
 1 5 10 15

Phe Leu Val Phe Ile Pro Leu Phe Ser Val Gly Ile Arg Met Ile Pro  
 20 25 30

Gly Arg Leu Thr Ala Val Ser Ala Thr Val Gly Asn Gly Phe Asp Leu  
 35 40 45

Gly Ser Phe Val Glu Ala Pro Glu Tyr Arg Asn Gly Lys Glu Cys Val  
 50 55 60

Ser Gln Ser Leu Asn Arg Glu Asn Phe Val Ser Ser Cys Asp Ala Ser  
 65 70 75 80

Leu Val His Val Ala Met Thr Leu Asp Ser Glu Tyr Leu Arg Gly Ser  
 85 90 95

Ile Ala Ala Val His Ser Met Leu Arg His Ala Ser Cys Pro Glu Asn  
 100 105 110

Val Phe Phe His Leu Ile Ala Ala Glu Phe Asp Pro Ala Ser Pro Arg  
 115 120 125

Val Leu Ser Gln Leu Val Arg Ser Thr Phe Pro Ser Leu Asn Phe Lys  
 130 135 140

Val Tyr Ile Phe Arg Glu Asp Thr Val Ile Asn Leu Ile Ser Ser Ser  
 Page 63

## 14-03 WO.sequence listing.txt

145                      150                      155                      160  
 Ile Arg Gln Ala Leu Glu Asn Pro Leu Asn Tyr Ala Arg Asn Tyr Leu  
                          165                                      170                                      175  
 Gly Asp Ile Leu Asp Pro Cys Val Asp Arg Val Ile Tyr Leu Asp Ser  
                          180                                      185                                      190  
 Asp Ile Ile Val Val Asp Asp Ile Thr Lys Leu Trp Asn Thr Ser Leu  
                          195                                      200                                      205  
 Thr Gly Ser Arg Ile Ile Gly Ala Pro Glu Tyr Cys His Ala Asn Phe  
                          210                                      215                                      220  
 Thr Lys Tyr Phe Thr Ser Gly Phe Trp Ser Asp Pro Ala Leu Pro Gly  
                          225                                      230                                      235                                      240  
 Phe Phe Ser Gly Arg Lys Pro Cys Tyr Phe Asn Thr Gly Val Met Val  
                                          245                                      250                                      255  
 Met Asp Leu Val Arg Trp Arg Glu Gly Asn Tyr Arg Glu Lys Leu Glu  
                                          260                                      265                                      270  
 Thr Trp Met Gln Ile Gln Lys Lys Lys Arg Ile Tyr Asp Leu Gly Ser  
                                          275                                      280                                      285  
 Leu Pro Pro Phe Leu Leu Val Phe Ala Gly Asn Val Glu Ala Ile Asp  
                                          290                                      295                                      300  
 His Arg Trp Asn Gln His Gly Leu Gly Gly Asp Asn Val Arg Gly Ser  
                                          305                                      310                                      315                                      320  
 Cys Arg Ser Leu His Lys Gly Pro Val Ser Leu Leu His Trp Ser Gly  
                                          325                                      330                                      335  
 Lys Gly Lys Pro Trp Val Arg Leu Asp Glu Lys Arg Pro Cys Pro Leu  
                                          340                                      345                                      350  
 Asp His Leu Trp Glu Pro Tyr Asp Leu Tyr Glu His Lys Ile Glu Arg  
                                          355                                      360                                      365  
 Ala Lys Asp Gln Ser Leu Phe Gly Phe Ser Ser Leu Ser Glu Leu Thr  
                                          370                                      375                                      380  
 Glu Asp Ser Ser Phe Phe  
                                          385                                      390



## 14-03 wo.sequence listing.txt

&lt;210&gt; 41

&lt;211&gt; 1056

&lt;212&gt; DNA

&lt;213&gt; Arabidopsis thaliana

&lt;400&gt; 41

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atggcctcaa ggagcctctc ctatacacia ctcctaggcc tcctgtcctt tataactctc      60
ttggtcacaa ccaccactat ggcgggttcgt gttggagtca ttcttcataa gcctttctgct    120
ccaactcttc ctgtttttcag agaagccccg gcttttcgaa acggtgatca atgcgggact    180
cgtgaggctg atcagattca tatcgccatg actctcgaca caaactacct ccgtggcaca    240
atggctgccc ttttgtctct ccttcaacat tccacttgcc ctgaaaacct ctcttttcat    300
ttcctgtccc ttcctcattt cgaaaacgac cttttcacca gcatcaaata aacctttcct    360
tacctaaact tcaagattta tcagtttgat ccaaacctcg tccgcagcaa gatatcgaaa    420
tccatcaggc aagcccttga tcagcctctt aactacgcaa gaatctacct cgcggatata    480
atccctagca gcgttgacag gatcatctac ttagactcag acctcgttgt ggtagacgac    540
atagagaagc tgtggcatgt ggagatggaa ggtaaagtgg tggctgctcc cgagtactgc    600
cacgcaaact tcaccatta tttcacaaga actttctggt cagaccgggt attggtcaaa    660
gttcttgaag gaaaacgtcc gtgttatttc aacacagggg tgatggttgt ggatgtaaac    720
aatggagga aaggaatgta tacacagaag gtagaagagt ggatgacaat tcagaagcag    780
aagaggatat accatttggg atcattacct ccgtttctgc tgatattcgc cggatgata    840
aaagcgggta atcataggtg gaaccagcat ggtctaggag gtgataattt cgaaggaaga    900
tgtagaacgt tgcattccgg accgataagt cttcttcact ggagtggaaa agggaagcca    960
tggttaagac tagattcaag gaagccttgt atcgttgatc atctatgggc accgtatgat   1020
ctgtaccgtt catcaagaca ttcattagaa gagtag                                1056

```

&lt;210&gt; 42

&lt;211&gt; 351

&lt;212&gt; PRT

&lt;213&gt; Arabidopsis thaliana

&lt;400&gt; 42

```

Met Ala Ser Arg Ser Leu Ser Tyr Thr Gln Leu Leu Gly Leu Leu Ser
1           5           10           15

```

```

Phe Ile Leu Leu Leu Val Thr Thr Thr Thr Met Ala Val Arg Val Gly
           20           25           30

```

```

Val Ile Leu His Lys Pro Ser Ala Pro Thr Leu Pro Val Phe Arg Glu
           35           40           45

```

```

Ala Pro Ala Phe Arg Asn Gly Asp Gln Cys Gly Thr Arg Glu Ala Asp
                               Page 65

```

## 14-03 WO.sequence listing.txt

50  
 55  
 60  
 Gln Ile His Ile Ala Met Thr Leu Asp Thr Asn Tyr Leu Arg Gly Thr  
 65 70 75 80  
 Met Ala Ala Val Leu Ser Leu Leu Gln His Ser Thr Cys Pro Glu Asn  
 85 90 95  
 Leu Ser Phe His Phe Leu Ser Leu Pro His Phe Glu Asn Asp Leu Phe  
 100 105 110  
 Thr Ser Ile Lys Ser Thr Phe Pro Tyr Leu Asn Phe Lys Ile Tyr Gln  
 115 120 125  
 Phe Asp Pro Asn Leu Val Arg Ser Lys Ile Ser Lys Ser Ile Arg Gln  
 130 135 140  
 Ala Leu Asp Gln Pro Leu Asn Tyr Ala Arg Ile Tyr Leu Ala Asp Ile  
 145 150 155 160  
 Ile Pro Ser Ser Val Asp Arg Ile Ile Tyr Leu Asp Ser Asp Leu Val  
 165 170 175  
 Val Val Asp Asp Ile Glu Lys Leu Trp His Val Glu Met Glu Gly Lys  
 180 185 190  
 Val Val Ala Ala Pro Glu Tyr Cys His Ala Asn Phe Thr His Tyr Phe  
 195 200 205  
 Thr Arg Thr Phe Trp Ser Asp Pro Val Leu Val Lys Val Leu Glu Gly  
 210 215 220  
 Lys Arg Pro Cys Tyr Phe Asn Thr Gly Val Met Val Val Asp Val Asn  
 225 230 235 240  
 Lys Trp Arg Lys Gly Met Tyr Thr Gln Lys Val Glu Glu Trp Met Thr  
 245 250 255  
 Ile Gln Lys Gln Lys Arg Ile Tyr His Leu Gly Ser Leu Pro Pro Phe  
 260 265 270  
 Leu Leu Ile Phe Ala Gly Asp Ile Lys Ala Val Asn His Arg Trp Asn  
 275 280 285  
 Gln His Gly Leu Gly Gly Asp Asn Phe Glu Gly Arg Cys Arg Thr Leu  
 290 295 300

## 14-03 WO.sequence listing.txt

His Pro Gly Pro Ile Ser Leu Leu His Trp Ser Gly Lys Gly Lys Pro  
 305 310 315 320

Trp Leu Arg Leu Asp Ser Arg Lys Pro Cys Ile Val Asp His Leu Trp  
 325 330 335

Ala Pro Tyr Asp Leu Tyr Arg Ser Ser Arg His Ser Leu Glu Glu  
 340 345 350

<210> 43  
 <211> 1098  
 <212> DNA  
 <213> Arabidopsis thaliana

<400> 43  
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 gatttaaatgg aagctccagc atatcaaac ggtcttgatt gctctgtttt agccaaaaac 180  
 agactcttgt tagcttgatg tccatcagct gttcatatag ctatgactct agatccagct 240  
 tacttgcggtg gcacgggtatc tgcagtacat tccatcctca aacacacttc ttgccctgaa 300  
 aacatcttct tccacttcat tgcttcgggt acaagtcagg gttccctcgc caagacccta 360  
 tcctctgttt ttcttcttt gagtttcaa gtctatacct ttgaagaaac cacggtcaag 420  
 aatctaattct cttcttctat aagacaagct cttgatagtc ctttgaatta cgcaagaagc 480  
 tacttatccg agattctttc ttcgtgtgtt agtcgagtga tttatctcga ttcggatgtg 540  
 attgtggtcg atgatattca gaaactatgg aagatttctt tatccgggtc aagaacaatc 600  
 ggtgcaccag agtattgccg cgcaaatttc accaaatact tcacagatag tttctggtcc 660  
 gatcaaaaac tctcgagtgt cttcgattcc aagactcctt gttatttcaa cacaggagtg 720  
 atgggttatcg atttagagcg atggagagaa ggagattaca cgagaaagat cgaaaactgg 780  
 atgaagattc agaaagaaga taagagaatc tacgaattgg gttctttacc accgtttctt 840  
 ctagtgtttg gtggtgatat tgaagctatt gatcatcaat ggaaccaaca cgggtctcgg 900  
 ggagacaaca ttgtgagtag ttgtagatct ttgcatcctg gtccgggttag ttgatacat 960  
 tggagtggta aaggggaagcc atggggttagg cttgatgatg gtaagccttg tccaattgat 1020  
 tatctttggg ctccttatga tcttcacaag tcacagaggc agtatcttca atacaatcaa 1080  
 gagttagaaa ttctttga 1098

<210> 44  
 <211> 365  
 <212> PRT  
 <213> Arabidopsis thaliana

<400> 44

## 14-03 WO.sequence listing.txt

Met Met Ser Gly Ser Arg Leu Ala Ser Arg Leu Ile Ile Ile Phe Ser  
 1 5 10 15  
 Ile Ile Ser Thr Ser Phe Phe Thr Val Glu Ser Ile Arg Leu Phe Pro  
 20 25 30  
 Asp Ser Phe Asp Asp Ala Ser Ser Asp Leu Met Glu Ala Pro Ala Tyr  
 35 40 45  
 Gln Asn Gly Leu Asp Cys Ser Val Leu Ala Lys Asn Arg Leu Leu Leu  
 50 55 60  
 Ala Cys Asp Pro Ser Ala Val His Ile Ala Met Thr Leu Asp Pro Ala  
 65 70 75 80  
 Tyr Leu Arg Gly Thr Val Ser Ala Val His Ser Ile Leu Lys His Thr  
 85 90 95  
 Ser Cys Pro Glu Asn Ile Phe Phe His Phe Ile Ala Ser Gly Thr Ser  
 100 105 110  
 Gln Gly Ser Leu Ala Lys Thr Leu Ser Ser Val Phe Pro Ser Leu Ser  
 115 120 125  
 Phe Lys Val Tyr Thr Phe Glu Glu Thr Thr Val Lys Asn Leu Ile Ser  
 130 135 140  
 Ser Ser Ile Arg Gln Ala Leu Asp Ser Pro Leu Asn Tyr Ala Arg Ser  
 145 150 155 160  
 Tyr Leu Ser Glu Ile Leu Ser Ser Cys Val Ser Arg Val Ile Tyr Leu  
 165 170 175  
 Asp Ser Asp Val Ile Val Val Asp Asp Ile Gln Lys Leu Trp Lys Ile  
 180 185 190  
 Ser Leu Ser Gly Ser Arg Thr Ile Gly Ala Pro Glu Tyr Cys His Ala  
 195 200 205  
 Asn Phe Thr Lys Tyr Phe Thr Asp Ser Phe Trp Ser Asp Gln Lys Leu  
 210 215 220  
 Ser Ser Val Phe Asp Ser Lys Thr Pro Cys Tyr Phe Asn Thr Gly Val  
 225 230 235 240  
 Met Val Ile Asp Leu Glu Arg Trp Arg Glu Gly Asp Tyr Thr Arg Lys  
 245 250 255

## 14-03 WO.sequence listing.txt

Ile Glu Asn Trp Met Lys Ile Gln Lys Glu Asp Lys Arg Ile Tyr Glu  
                   260                  265                  270

Leu Gly Ser Leu Pro Pro Phe Leu Leu Val Phe Gly Gly Asp Ile Glu  
                   275                  280                  285

Ala Ile Asp His Gln Trp Asn Gln His Gly Leu Gly Gly Asp Asn Ile  
                   290                  295                  300

Val Ser Ser Cys Arg Ser Leu His Pro Gly Pro Val Ser Leu Ile His  
                   305                  310                  315                  320

Trp Ser Gly Lys Gly Lys Pro Trp Val Arg Leu Asp Asp Gly Lys Pro  
                   325                  330                  335

Cys Pro Ile Asp Tyr Leu Trp Ala Pro Tyr Asp Leu His Lys Ser Gln  
                   340                  345                  350

Arg Gln Tyr Leu Gln Tyr Asn Gln Glu Leu Glu Ile Leu  
                   355                  360                  365

<210> 45  
 <211> 1026  
 <212> DNA  
 <213> Arabidopsis thaliana

<400> 45  
 atgcactcga agtttatatt atatctcagc atcctcgccg tattcaccgt ctctttcgcc 60  
 ggcggcgaga gattcaaaga agctccaaag ttcttcaact ccccgagtg tctaaccatc 120  
 gaaaacgatg aagatttcgt ttgttcagac aaagccatcc acgtggcaat gaccttagac 180  
 acagcttacc tccgtggctc aatggccgtg attctctccg tctccaaca ctcttcttgt 240  
 cctcaaaaca ttgttttcca cttcgtcact tcaaaacaaa gccaccgact ccaaaactac 300  
 gtcgttgctt cttttcccta cttgaaattc cgaatttacc cttacgacgt agccgccatc 360  
 tccggcctca tctcaacctc catccgctcc gcgctagact ctccgctaaa ctacgcaaga 420  
 aactacctcg ccgacattct tcccacgtgc ctctcacgtg tcgtatacct agactcagat 480  
 ctcatactcg tcgatgacat ctccaagctc ttctccactc acatccctac cgacgtcggt 540  
 ttagccgcgc ctgagtactg caacgcaaac ttcacgactt actttactcc gacgttttgg 600  
 tcaaaccctt ctctctccat cacactatcc ctcaaccgcc gtgctacacc gtgttacttc 660  
 aacaccggag tgatgggcat cgagttaaag aaatggcgag aaggagatta cacgaggaag 720  
 atcatagagt ggatggagtt acaaaaacgg ataagaatct acgagttagg ctctttacca 780  
 ccgtttttac ttgtcttcgc cggaacata gctccggtag atcaccggtg gaaccaacac 840

## 14-03 WO.sequence listing.txt

```

ggtttaggag gagataattt tagaggactg tgtcgagatt tgcattcagg tccagtgagt    900
ttgttgcatt ggagtgggaa agggaagcca tgggtaaggt tagatgatgg tcgaccttgc    960
ccgcttgatg cactttgggt tccatatgat ttgtagagt cacggttcga ccttatcgag    1020
agttaa                                1026

```

```

<210> 46
<211> 341
<212> PRT
<213> Arabidopsis thaliana

```

```

<400> 46

```

```

Met His Ser Lys Phe Ile Leu Tyr Leu Ser Ile Leu Ala Val Phe Thr
1          5          10          15

```

```

Val Ser Phe Ala Gly Gly Glu Arg Phe Lys Glu Ala Pro Lys Phe Phe
          20          25          30

```

```

Asn Ser Pro Glu Cys Leu Thr Ile Glu Asn Asp Glu Asp Phe Val Cys
          35          40          45

```

```

Ser Asp Lys Ala Ile His Val Ala Met Thr Leu Asp Thr Ala Tyr Leu
          50          55          60

```

```

Arg Gly Ser Met Ala Val Ile Leu Ser Val Leu Gln His Ser Ser Cys
65          70          75          80

```

```

Pro Gln Asn Ile Val Phe His Phe Val Thr Ser Lys Gln Ser His Arg
          85          90          95

```

```

Leu Gln Asn Tyr Val Val Ala Ser Phe Pro Tyr Leu Lys Phe Arg Ile
          100          105          110

```

```

Tyr Pro Tyr Asp Val Ala Ala Ile Ser Gly Leu Ile Ser Thr Ser Ile
          115          120          125

```

```

Arg Ser Ala Leu Asp Ser Pro Leu Asn Tyr Ala Arg Asn Tyr Leu Ala
          130          135          140

```

```

Asp Ile Leu Pro Thr Cys Leu Ser Arg Val Val Tyr Leu Asp Ser Asp
          145          150          155          160

```

```

Leu Ile Leu Val Asp Asp Ile Ser Lys Leu Phe Ser Thr His Ile Pro
          165          170          175

```

```

Thr Asp Val Val Leu Ala Ala Pro Glu Tyr Cys Asn Ala Asn Phe Thr
          180          185          190

```

## 14-03 WO.sequence listing.txt

Thr Tyr Phe Thr Pro Thr Phe Trp Ser Asn Pro Ser Leu Ser Ile Thr  
 195 200 205  
 Leu Ser Leu Asn Arg Arg Ala Thr Pro Cys Tyr Phe Asn Thr Gly Val  
 210 215 220  
 Met Val Ile Glu Leu Lys Lys Trp Arg Glu Gly Asp Tyr Thr Arg Lys  
 225 230 235 240  
 Ile Ile Glu Trp Met Glu Leu Gln Lys Arg Ile Arg Ile Tyr Glu Leu  
 245 250 255  
 Gly Ser Leu Pro Pro Phe Leu Leu Val Phe Ala Gly Asn Ile Ala Pro  
 260 265 270  
 Val Asp His Arg Trp Asn Gln His Gly Leu Gly Gly Asp Asn Phe Arg  
 275 280 285  
 Gly Leu Cys Arg Asp Leu His Pro Gly Pro Val Ser Leu Leu His Trp  
 290 295 300  
 Ser Gly Lys Gly Lys Pro Trp Val Arg Leu Asp Asp Gly Arg Pro Cys  
 305 310 315 320  
 Pro Leu Asp Ala Leu Trp Val Pro Tyr Asp Leu Leu Glu Ser Arg Phe  
 325 330 335  
 Asp Leu Ile Glu Ser  
 340

<210> 47  
 <211> 1086  
 <212> DNA  
 <213> Arabidopsis thaliana

<400> 47  
 atgctttgga tcatgagatt ctccggttta ttctccgccg ctttggttat catcgtcctc 60  
 tctccttctc tccaatcgtt tcttcagct gaagctatca gatccttca tctcgacgt 120  
 tacctccgtt tcccctcctc cgatccaccg ccgcatagat tctccttcag aaaagctcct 180  
 gttttccgca atgccgccga ttgcgccgcc gcagatatcg attccggcgt ctgtaaccct 240  
 tccttggtcc acgtcgcgat tactctcgat ttcgagtacc tgcgtggctc aatcgccgcc 300  
 gttcattcga ttctcaagca ctgcgtgtgt cccgagagcg tcttcttcca tttcctcgtc 360  
 tccgagactg acctagaatc cttgattcgt tcgacttttc ccgaattgaa attaaaggtt 420  
 tactacttcg atccggagat tgtacggacg ctgatctcaa cctccgtgag acaagcgctc 480

## 14-03 WO.sequence listing.txt

```

gagcagccgt tgaattacgc tagaaattac ctagctgacc ttctcgagcc ttgcgtgcgt      540
cgcgatgatct acctagattc cgatctaata gtcgtcgacg acatcgcaaa gctctggatg      600
acgaaactgg gatcgaaaac gatcggagct cccgagtact gtcacgcgaa cttcacaag      660
tatttcacac cggcgttctg gtccgacgag aggttctccg gagctttctc cgggaggaaa      720
ccgtgctact tcaacacggg agtgatggtg atggatctag agagatggag gcgcgtaggg      780
tacacggagg tgatagagaa atggatggag attcagaaga gtgataggat ttacgagctg      840
ggatcattgc cgccgttctt gttggtgttc gccggagaag tagctccgat agagcatcgg      900
tggaaccagc atgggcttgg tggagataac gtgagaggaa gctgtagaga tttacatccc      960
ggtccggtta gcttgcttca ttggtccggt agtggtaaac cgtggtttcg gttagattcg     1020
agacggcctt gtccacttga tactctttgg gcaccttatg atttgatgg acactactct     1080
cgctga                                           1086

```

```

<210> 48
<211> 361
<212> PRT
<213> Arabidopsis thaliana
<400> 48

```

```

Met Leu Trp Ile Met Arg Phe Ser Gly Leu Phe Ser Ala Ala Leu Val
 1             5             10             15

Ile Ile Val Leu Ser Pro Ser Leu Gln Ser Phe Pro Pro Ala Glu Ala
      20             25             30

Ile Arg Ser Ser His Leu Asp Ala Tyr Leu Arg Phe Pro Ser Ser Asp
      35             40             45

Pro Pro Pro His Arg Phe Ser Phe Arg Lys Ala Pro Val Phe Arg Asn
      50             55             60

Ala Ala Asp Cys Ala Ala Ala Asp Ile Asp Ser Gly Val Cys Asn Pro
      65             70             75             80

Ser Leu Val His Val Ala Ile Thr Leu Asp Phe Glu Tyr Leu Arg Gly
      85             90             95

Ser Ile Ala Ala Val His Ser Ile Leu Lys His Ser Ser Cys Pro Glu
      100            105            110

Ser Val Phe Phe His Phe Leu Val Ser Glu Thr Asp Leu Glu Ser Leu
      115            120            125

```



## 14-03 WO.sequence listing.txt

Ile Arg Ser Thr Phe Pro Glu Leu Lys Leu Lys Val Tyr Tyr Phe Asp  
 130 135 140

Pro Glu Ile Val Arg Thr Leu Ile Ser Thr Ser Val Arg Gln Ala Leu  
 145 150 155 160

Glu Gln Pro Leu Asn Tyr Ala Arg Asn Tyr Leu Ala Asp Leu Leu Glu  
 165 170 175

Pro Cys Val Arg Arg Val Ile Tyr Leu Asp Ser Asp Leu Ile Val Val  
 180 185 190

Asp Asp Ile Ala Lys Leu Trp Met Thr Lys Leu Gly Ser Lys Thr Ile  
 195 200 205

Gly Ala Pro Glu Tyr Cys His Ala Asn Phe Thr Lys Tyr Phe Thr Pro  
 210 215 220

Ala Phe Trp Ser Asp Glu Arg Phe Ser Gly Ala Phe Ser Gly Arg Lys  
 225 230 235 240

Pro Cys Tyr Phe Asn Thr Gly Val Met Val Met Asp Leu Glu Arg Trp  
 245 250 255

Arg Arg Val Gly Tyr Thr Glu Val Ile Glu Lys Trp Met Glu Ile Gln  
 260 265 270

Lys Ser Asp Arg Ile Tyr Glu Leu Gly Ser Leu Pro Pro Phe Leu Leu  
 275 280 285

Val Phe Ala Gly Glu Val Ala Pro Ile Glu His Arg Trp Asn Gln His  
 290 295 300

Gly Leu Gly Gly Asp Asn Val Arg Gly Ser Cys Arg Asp Leu His Pro  
 305 310 315 320

Gly Pro Val Ser Leu Leu His Trp Ser Gly Ser Gly Lys Pro Trp Phe  
 325 330 335

Arg Leu Asp Ser Arg Arg Pro Cys Pro Leu Asp Thr Leu Trp Ala Pro  
 340 345 350

Tyr Asp Leu Tyr Gly His Tyr Ser Arg  
 355 360

<210> 49  
 <211> 1041  
 <212> DNA

## 14-03 WO.sequence listing.txt

&lt;213&gt; Arabidopsis thaliana

&lt;400&gt; 49

```

atgctttgga taacgagatt tgctggatta ttctccgccg cgatggcagt gatcgtgtta      60
tctccgtcgc ttcaagtcatt tcctccggcg gcggcaatcc gttcttctcc atcaccgatc      120
ttcagaaaag ctccagcggg gttcaacaac ggcgacgaat gtctctcctc cggcggcgctc      180
tgcaatccgt cgttgggtcca cgtggcgatc acgttagacg tagagtacct gcgtgggtca      240
atcgcagccg ttaactcgat ccttcagcac tcggtgtgtc cagagagcgt cttcttccac      300
ttcatcgccg tctccgagga aacaaacctg ttggagtcgc tggtagatc ggttttcccg      360
agactgaaat tcaatattta cgattttgcc cctgagacag ttcgtggttt gatttcttct      420
tccgtgagac aagctctcga gcagcctctg aactacgcta gaagctactt agcggatctg      480
ctggagcctt gtgttaaccg tgtcatatac ttggattcgg atcttgtcgt cgtcgatgac      540
atcgctaagc tttggaaaac tagcctaggc tcgaggataa tcggagctcc ggagtattgt      600
cacgcgaatt tcacgaaata cttcaccgga ggattctggt cggaggagag attctccggt      660
acctttagag ggaggaagcc atgttacttc aacacaggtg tgatggtgat agatcttaag      720
aatggagaa gaggtgggta cacgaaacgt atcgagaaat ggatggagat tcagagaaga      780
gagaggattt acgaactagg ctcgcttcca ccgtttcttc tagttttctc cggtcacgtg      840
gctcccatct ctcaccggtg gaaccagcat ggacttggtg gtgacaatgt tagaggtagc      900
tgtcgtgatt tgcacctcgg tcctgtgagt ttgctgcatt ggtctggtag tggcaagccc      960
tggataagac tcgattccaa acggccttgt cccttagacg cattatggac gccttacgac     1020
ttgtatcgac attcgcattg a                                     1041

```

&lt;210&gt; 50

&lt;211&gt; 346

&lt;212&gt; PRT

&lt;213&gt; Arabidopsis thaliana

&lt;400&gt; 50

```

Met Leu Trp Ile Thr Arg Phe Ala Gly Leu Phe Ser Ala Ala Met Ala
1           5           10          15
Val Ile Val Leu Ser Pro Ser Leu Gln Ser Phe Pro Pro Ala Ala Ala
20          25          30
Ile Arg Ser Ser Pro Ser Pro Ile Phe Arg Lys Ala Pro Ala Val Phe
35          40          45
Asn Asn Gly Asp Glu Cys Leu Ser Ser Gly Gly Val Cys Asn Pro Ser
50          55          60

```

## 14-03 WO.sequence listing.txt

Leu Val His Val Ala Ile Thr Leu Asp Val Glu Tyr Leu Arg Gly Ser  
 65 70 75 80  
 Ile Ala Ala Val Asn Ser Ile Leu Gln His Ser Val Cys Pro Glu Ser  
 85 90 95  
 Val Phe Phe His Phe Ile Ala Val Ser Glu Glu Thr Asn Leu Leu Glu  
 100 105 110  
 Ser Leu Val Arg Ser Val Phe Pro Arg Leu Lys Phe Asn Ile Tyr Asp  
 115 120 125  
 Phe Ala Pro Glu Thr Val Arg Gly Leu Ile Ser Ser Val Arg Gln  
 130 135 140  
 Ala Leu Glu Gln Pro Leu Asn Tyr Ala Arg Ser Tyr Leu Ala Asp Leu  
 145 150 155 160  
 Leu Glu Pro Cys Val Asn Arg Val Ile Tyr Leu Asp Ser Asp Leu Val  
 165 170 175  
 Val Val Asp Asp Ile Ala Lys Leu Trp Lys Thr Ser Leu Gly Ser Arg  
 180 185 190  
 Ile Ile Gly Ala Pro Glu Tyr Cys His Ala Asn Phe Thr Lys Tyr Phe  
 195 200 205  
 Thr Gly Gly Phe Trp Ser Glu Glu Arg Phe Ser Gly Thr Phe Arg Gly  
 210 215 220  
 Arg Lys Pro Cys Tyr Phe Asn Thr Gly Val Met Val Ile Asp Leu Lys  
 225 230 235 240  
 Lys Trp Arg Arg Gly Gly Tyr Thr Lys Arg Ile Glu Lys Trp Met Glu  
 245 250 255  
 Ile Gln Arg Arg Glu Arg Ile Tyr Glu Leu Gly Ser Leu Pro Pro Phe  
 260 265 270  
 Leu Leu Val Phe Ser Gly His Val Ala Pro Ile Ser His Arg Trp Asn  
 275 280 285  
 Gln His Gly Leu Gly Gly Asp Asn Val Arg Gly Ser Cys Arg Asp Leu  
 290 295 300  
 His Pro Gly Pro Val Ser Leu Leu His Trp Ser Gly Ser Gly Lys Pro  
 305 310 315 320

## 14-03 WO.sequence listing.txt

Trp Ile Arg Leu Asp Ser Lys Arg Pro Cys Pro Leu Asp Ala Leu Trp  
325 330 335

Thr Pro Tyr Asp Leu Tyr Arg His Ser His  
340 345